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Running Head: PERSONALITY CHARACTERISTICS

The Effects of Personality Characteristics and Stress on Physical Illness

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Abstract

Recent research has indicated that personality characteristics and stress may influence the incidence of illness (Dreher, 1995). The majority of studies have examined personality characteristics and stress in acutely and chronically ill populations. However, this phenomenon has not been extensively studied in healthy populations.

The purpose of this study was to examine the relationships among personality characteristics, subjective stress, and physical illness in a sample of undergraduate students. This study tested a moderator model in which personality characteristics interact with stress to influence the incidence of physical illness using hierarchical multiple regression. Study participants included 55 undergraduate students selected from two classes at a small mid-western university. These two classes were chosen to represent the diversity of majors, gender, and academic level at the university. Personality characteristics were assessed with measures of hardiness and assertiveness. A series of four surveys assessing hardiness, assertiveness, subjective stress, and physical illness as well as a demographic sheet were distributed to study participants to be completed during class time. The analyses revealed significant correlations between the personality characteristics, hardiness and assertiveness, and subjective stress. The data did not offer empirical support for the moderator model, thus suggesting that personality characteristics do not interact with subjective stress to influence the incidence of physical illness. However this finding should be considered with caution since the measure used to assess physical illness may have limited sensitivity in this population. Future research is indicated using different measures of physical illness with greater sensitivity in healthy populations.

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Mom, thank you for always listening and reminding me not to be too hard on myself. Finally, I would like to thank my entire family who were available to support me when no one else was.

The Effects of Personality Characteristics and Stress on Physical Illness

Studies have shown that illness increases in the presence of stress, but the correlation between illness and stress is small. Research conducted in psychoneuroimmunology suggests that personality characteristics provide a partial explanation for the relationship between stress and illness. In the past two decades, seven personality characteristics have been shown to be associated with better health states: (a) the A.C.E. Factor (attend, connect, and express), (b) the capacity to confide, (c) hardiness, (d) assertiveness, (e) the power of love versus love of power, (f) altruism, and (g) self-complexity (Dreher, 1995). People with these personality characteristics tend to suffer from fewer illnesses than those who do not possess such personality characteristics.

In recent decades, studies have been conducted showing humans' emotional reactions to stress may affect physical illness. Several studies done on persons with cancer, AIDS, and common everyday infections demonstrate the role personality characteristics and other psychological aspects have on stress and physical illness. For example, Spiegel (1991) conducted a study on metastatic breast cancer survivors who participated in group therapy emphasizing social support, emotional expression, assertiveness, and self-hypnosis. Women who participated in the therapy survived twice as long as women who did not participate. Furthermore, Fawzy and Fawzy (1993) gave melanoma patients group therapy including relaxation, cognitive therapy to develop active coping skills, and psychological support. After six years, the participants had only one third the rate of reoccurrence and death compared to non-participants. When patients with HIV received group therapy including relaxation, emotional expression, cognitive restructuring, and social support, they had less decline in CD4 cells compared to counterparts (Antoni, Bageget, & Ironson, 1990). Patients remaining in the program until completion were less likely to develop AIDS two years later. Finally, there is evidence that persons with selected personality characteristics better resist common everyday infections. Borysenko (1985) reported that McClelland found when actions are performed to raise a person's affiliative trust, the person's

immunoglobulin A levels rise. An individual suffers less from a cold than someone who does not undergo the treatment to raise affiliative trust (Dreher, 1995).

Several research studies indicate that the personality characteristics of hardiness and assertiveness may influence the relationship between stress and physical illness. Hardiness is defined as “a set of beliefs about oneself, the world, and how they interact. It takes shape as a sense of personal commitment to what you are doing, a sense of control over your life, and a feeling of challenge” (Fischman, 1987, p. 26). In studies of business executives, Oulette (1988) observed that most individuals’ frequency of physical illness did not increase with more stress. Furthermore, three distinct qualities (commitment, control, and challenge) which Oulette called hardiness were evident in business executives who suffered from less physical illness. Oulette found that healthier executives were not younger, more educated, wealthier, or in positions of more power than counterparts who became ill. The only difference was that they had higher levels of hardiness.

Solomon has also done research on the effects of hardiness on stress and physical illness. Solomon and Temoshok (1990) conducted long term research on full-blown AIDS survivors who were predicted to die years before. In a study using Oulette’s hardiness questionnaire, these AIDS survivors were found to have a greater sense of control than AIDS patients who were not as healthy. They had stronger immune systems than their counterparts. Compared to other patients with similar immunology profiles, they were got sick less and had more energy.

Earlier in his career, Solomon also conducted research on the effects of assertiveness on stress and illness. Solomon and Moos (1965) studied twenty women with arthritis and their healthy sisters examining several variables, assertiveness being one. In each case, both pairs of sisters had a genetic disposition for developing rheumatoid arthritis, but in each case only one of the sisters did. Interestingly, in every case, the sister without rheumatoid arthritis was more assertive than the afflicted sister. Later Solomon wanted to test this suggestion more directly (1981). He presented twenty pairs of sisters with a nasty, highly unreasonable department store

complaint manager. In all cases, the healthy sisters were more assertive. These results suggest that assertiveness may decrease or protect against stress so that illness caused by autoimmune disease is less threatening to the body (Solomon, 1981).

More recently, Solomon and Tomoshok (1990) found assertiveness to influence the survival time of AIDS patients. In a formal study conducted on AIDS survivors, there was a strong correlation between the affirmative answer to a question assessing assertiveness and stronger immune functions. The ability to say yes to “Would you refuse to do a favor requested by a friend if you did not wish to?” was associated with stronger responses of killer T cells, virus killing cells, and suppressor cells. Thus having the ability to say no was associated with a more effective immune system response to fighting HIV and AIDS.

The above studies suggest that possessing hardiness and assertiveness, at least in some subgroups of the general population, may help to decrease the occurrence and severity of physical illness. Furthermore, researchers feel that it is possible to foster both these characteristics (Kobasa, 1984). If hardiness and assertiveness help to resist physical illness and if stress causes physical illness, then fostering hardiness or assertiveness or decreasing stress may help people experience less illness. The purpose of this study was to examine the relationships among personality characteristics, stress, and physical illness in a sample of undergraduate students (Dreher, 1995).

The Model

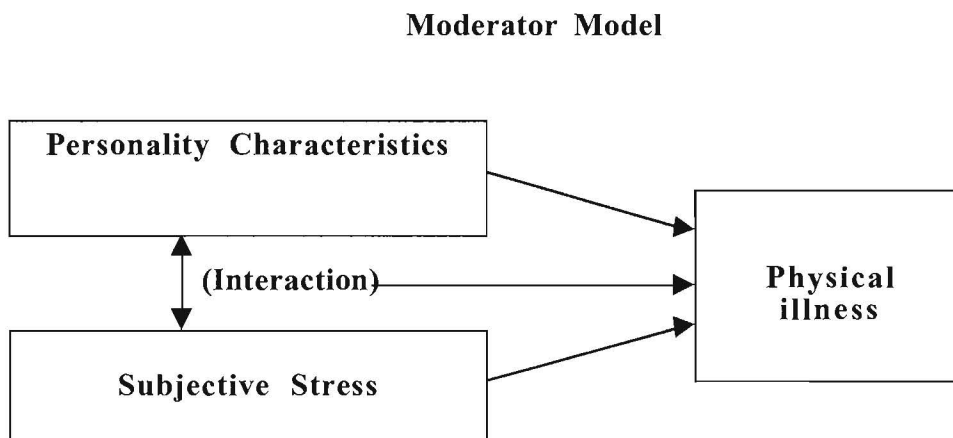
The model assumes that stress and each personality characteristic influence physical illness (Kobasa, Maddi, & Kahn, 1982). People perceive distressing circumstances, which raise stress levels making individuals feel helpless and anxious. These feelings weaken the immune system and resistance to disease. When people have these feelings associated with distressing circumstance individual cells of the immune system are have a decreased ability to fight off disease which in turn makes people more vulnerable to disease causing agents present in the environment (Jacobs, Spiken, & Norman, 1969). However, as stated earlier, studies show people with certain

personality characteristics tend to suffer from fewer physical illnesses than those who do not possess such personality characteristics (Dreher, 1995).

There is also evidence that there may be an interaction between personality characteristics and subjective stress. People with selected personality dispositions do not interpret the world as meaningless, overwhelming, and undesirable so such people do not interpret events as stressful as other people might. Thus, these people have lower levels of subjective stress than people without the selected personality characteristics. Since it is suggested that stress causes biological states of adaptational exhaustion and depressed immunological surveillance, people having personality characteristics that help them interpret events and circumstances as less stressful are bolstered against physical illnesses to some degree (Schwartz, 1975).

A model for the interaction among these variables begins to surface. Subjective stress and personality characteristics interact with each other and this interaction influences physical illness but still each alone influences physical illness. For example, hardiness and subjective stress interact to influence physical illness together, but each alone still influences physical illness. This is also the model of interaction for assertiveness and subjective stress. The proposed model is pictured below.

Figure 1.



(C. Andersen, 1999)

Based on the evidence from past research and the model presented, the following preliminary hypotheses were developed:

1. As hardiness increases, subjective stress will decrease.
2. As assertiveness increases, subjective stress will decrease.
3. As hardiness increases, the physical illness will decrease.
4. As assertiveness increases, physical illness will decrease.

The moderator model hypothesis is as follows:

5. Subjective stress will interact with personality characteristics such that as levels of personality characteristics rise subjective stress will decrease and together they will be related to physical illness.

If significant findings are found, further analysis will be conducted combining scores of hardiness and assertiveness to look for a combined effect in the moderator model.

Method

Protection of Human Subjects

The protection of human subjects' rights was maintained and all procedures approved and advanced by the school's Institutional Review Board. To ensure students' welfare, principles of beneficence, respect for human dignity, and justice were upheld. To ensure that study participants did not feel coerced to participate in the study, the class instructor was asked to leave for the rest of the class once the researcher began explaining the study. Full disclosure of the purpose and content was provided to students before asking for participation. Furthermore, students were given a copy of the consent form which indicated that completion of the questionnaires was considered consent (see attached consent form in Appendix A). Students were able to terminate participation at any time. Information was collected during the last twenty-five minutes of class so that students who refused to participate could leave class early. To ensure anonymity, students were not asked to write their names or any other single identification item on the questionnaires.

Furthermore, questionnaires from each class were immediately put into a large folder before examining the information so that the research would not know individuals' responses.

Study Participants

Study participants were students enrolled in a small private liberal arts university in Central Illinois. Students from all majors who were enrolled in physical education and health classes participated voluntarily. Fifty-five study participants' data were included with the exception of data from students who did not properly fill out the questionnaires ($n = 2$). Although the sample did not statistically represent the university demographics, this convenience sample reflected diversity of gender, academic level, and major.

Procedure

Physical education and health classes were selected to provide access to the diversity of the student body and consent was obtained from faculty. In exchange for class time, the researcher offered to present aggregate findings to the class and/or hand out a sheet summarizing research findings. Class rosters were examined in the Registrar's office to verify the diversity of the classes. During a three-week time frame, the researcher went to the classes, explained the purpose of the research, answered any questions, and handed out consent forms. The same set of instructions were given to all classes (see Appendix B). Four questionnaires were administered together with a survey assessing demographics (See Appendix C). The researcher remained present until all study participants finished.

Instruments

The four questionnaires consisted of the following: the Index of Clinical Stress, the Hardiness Scale, the Assertion Inventory, and Symptoms Illness Survey (see Appendix D through G for instruments). Permission to use the Index of Clinical Stress was granted. Both the Assertion Inventory and the Hardiness Scale are public domain. No permission was needed on the Symptoms Illness Scale since the researcher created it.

The Index of Clinical Stress. For purposes of this study, stress is defined as the overall affective state or perceived distress an individual is experiencing without identifying the stressor itself (Abell, 1991). The Index of Clinical Stress measures subjective stress opposed to objective stress. This questionnaire is a 25-item instrument assessing the degree of problems study participants have with personal stress. Questions ask study participants to rate how often they experience stress feelings ranging on a continuum of none of the time to all of the time.

The Index of Clinical Stress was originally studied on 205 patients and family members recruited at a family practice program in a regional medical center in a midsize southern community. The mean age of the participants was 33 years. The majority were female, 72.1%. Furthermore, the majority of the sample was married, 62.6% (Abell, 1991).

Reliability is not completely reported on the Index of Clinical Stress. Internal consistency, alpha .96, is excellent; however, stability has not been reported so no knowledge on consistency is available. Validity is reported to be good. The test has good factorial validity and fair beginning construct validity. However, no coefficients for validity are reported (Abell, 1991).

The Hardiness Scale. The Hardiness Scale, developed primarily by Bartone, is a 45-item instrument consisting of three subscales measuring components of hardiness (Bartone, Ursano, Wright, & Ingraham, 1989). Hardiness, for this instrument, is defined as resiliency to stress based on how one approaches and interprets experiences. The components of hardiness are defined as the following: commitment, which refers to imputed meaning and purpose to self, others, and work; control, a sense of autonomy and influence on one's future; and challenge, a zest and excitement for life that is perceived as an opportunity for growth. In original studies, there was not much difference between scores for the subscales. However, higher scores are indicative of higher levels of hardiness (Bartone, Ursano, Wright, & Ingraham, 1989).

The Hardiness Scale was originally studied on military disaster officers, mostly males (93%) with a median age of 34. The summated internal consistency score of the Hardiness Scale is an alpha, .85. This can be broken down into the following three internal consistency

coefficients: .62, .66, and .82 for challenge, control, and commitment respectively. The 45-item scale correlated .93 with the 76-item pool from which it was created. Principal component factor analysis supported the three-subscale structure. Published norms regarding the scale have not been developed (Bartone, et al., 1989).

The Assertion Inventory. The Assertion Inventory, developed by Gambrill and Richey, was used to measure assertiveness. Assertiveness is related to how people handle themselves in a social situation, the ability that people have to affirm themselves in some way (1975). The following three categories of information are collected in regards to the Assertion Inventory: (1) degree of discomfort in relation to specific situations; (2) judged probability of engaging in a behavior; and (3) identification of situations in which a person would be likely to be more assertive. In initial studies on the Assertion Inventory, undergraduates' pre- and post-tests were .87 for discomfort and .81 for response probability. These three categories are quantified into a single total score. Overall, men and women scored fairly similarly. Spearman's rank correlation coefficient between men and women marking items as "rarely" or "never" was .88. Standard deviations for discomfort and response probability reflect a range of scores indicating that a wide distribution of assertion in a normal population. Increment validity was noted by comparing a clinical group receiving training on assertiveness to undergraduate samples. The clinical group had significantly higher scores of mean discomfort and fell more into categories of "unassertive" and "anxious-performer" compared to respondents of normal population indicating validity (Gambrill & Richey, 1975).

The Symptoms Illness Scale. Physical illness, for purposes of this study, refers to the following: minor acute infectious health deviations, which include colds, sore throats, flu, and symptoms of the aforementioned; exacerbations of current medical conditions, which include the worsening of diabetes, asthma, and any other chronic condition; and acute symptoms associated with stress, which include but are not limited to headaches, stomach aches, back pain, and exhaustion (Hafen, Karren, Frandsen, & Lee Smith, 1996). The Symptoms Illness Scale,

developed by Andersen, was based on the most frequent conditions that prompted undergraduate students to go to the university's health center: upper respiratory tract, throat, gastro-intestinal, musculo-skeletal, skin, and headache complaints (1999). Common health deviations associated with stress were also taken into consideration. For example, there was an item to assess frequency of headaches. The Symptoms Illness Scale has two parts. Part A assesses the frequency of the above mentioned conditions over the past month. Part B is a subjective rating of overall health ranging from 0 to 10 asking study participants to rate health compared to the worst and best it has ever been. Part B was only used to show the validity of the first nine questions in the instrument.

The Symptoms Illness Scale was pre-tested with ten university students. The pre-test was conducted to assess quality and face validity of the Symptoms Illness Scale. Three of the ten students who took the pre-test reported problems with the questionnaire. As a result, there were changes in the wording of several questions. For example, to clarify that cold referred to a head cold and not the physiological sensation of being cold, the term head was added. Cold became head cold. Furthermore, to clarify that muscle and bone pain was not referring to pain caused from athletics, the word pain was replaced with aching and a clarification saying "not due to physical activity" was added. Finally a correlation was run on Part A (frequency of physical conditions) and Part B (subjective health rating) of the Symptom Illness Scale after the data for the study was conducted. The two parts were significantly correlated at the .01 level ($r = -.542$) indicating that Part A detects illness states not associated with a person's best self-reported health.

Data Analysis

Descriptive statistics were assessed on all variables. Frequencies were calculated for demographic characteristics. To assess for demographic differences in the moderator model, T-tests and ANOVAs were completed. Pearson r correlations were used to determine significance among moderator model variables. Finally, hierarchical multiple regressions were run to test each subscale of hardiness and assertiveness in the moderator model. Alpha levels of both .05 and .01 were used for all statistical tests.

When data was missing, the mean for the questions on the instrument was assigned. Finally the hardiness subscales were not combined into a total score in order to obtain a more detailed analysis of the variable.

Results

Demographics

There were more study participants from the physical education classes than the health class. Furthermore, there were more female participants than male participants. Almost half of the study participants were juniors. The rest were almost equally divided among seniors, sophomores, and freshmen. There were a total of seventeen different majors represented. These were grouped into the following categories: fine arts, science, and liberal arts (see Appendix H for detailed breakdown). The majority of the study participants were liberal arts majors followed by science and fine arts respectively. Overall, the gender and type of major are consistent with university demographics within 20 percent. The academic level, over-represented by juniors, is not consistent with university demographics. The results of the frequency analyses are presented in Appendix I.

Study Variables

The study variables consisted of major variables: hardiness, assertiveness, subjective stress, and physical illness. These were measured by the following four instruments respectively: Hardiness Scale, Assertion Inventory, Index of Clinical Stress, and Symptoms Illness Score. There were a total of seven variables: three hardiness subscales (commitment, control, and challenge), assertiveness, subjective stress, and the two physical illness components (Part A and Part B of the Symptoms Illness Scale). The means and standard deviations of the study variables are present in Appendix J. T-tests and ANOVAs were run on these study variables. Scores did not differ based on major, gender, or academic level.

Hypotheses Findings

The first four hypotheses were tested using the Pearson r correlation. Pearson r correlation reports for hypotheses 1 through 4 are reported in Appendix K. The Moderator Model hypothesis was tested using the multiple regression analysis. The results of this hypothesis are reported in detail in Appendix L.

Preliminary Hypothesis 1. Hypothesis 1 stated that subjective stress (Index of Clinical Stress) would decrease as hardiness (Hardiness Scale) increased. To test Hypothesis 1, three separate Pearson r correlations were completed. Each of the three hardiness subscales (challenge, commitment, and control respectively) was correlated with the subjective stress. All three of the correlations were positively significant. Commitment was correlated with subjective stress and challenge was correlated with the subjective stress at the .05 level, while the correlation between control and subjective stress was significant at the .01 level. All these correlations were positive. Since negative correlations were hypothesized, Hypothesis 1 was not supported.

Preliminary Hypothesis 2. Hypothesis 2 stated that subjective stress (Index of Clinical Stress) would decrease as assertiveness (Assertion Inventory) increased. To test this hypothesis, a Pearson r correlation using assertiveness and subjective stress was completed. Assertiveness was significantly correlated with subjective stress at the .01 level. Since this was a positive correlation, Hypothesis 2 was not supported.

Preliminary Hypothesis 3. Hypothesis 3 stated that physical illness (Symptoms Illness Scale) would decrease as hardiness (Hardiness Scale) increased. Using Pearson r correlations, the three hardiness subscales (commitment, control, and challenge) were correlated with physical illness. Only Part A of the Symptoms Illness Scale (frequency of physical conditions) was used for the Pearson r correlations since Part A and Part B (the subjective health rating scale) of the Symptoms Illness Scales correlated significantly at the .01 level ($r = -.542$). None of the correlations were significant. Hypothesis 3 was not supported.

Preliminary Hypothesis 4. Hypothesis 4 stated that physical illness (Symptoms Illness Scale) would decrease as assertiveness (Assertion Inventory) increased. A Pearson r correlation using assertiveness and the physical illness was completed. Again only Part A (frequency of physical conditions) of the Symptoms Illness Scale was used for the reason stated in Hypothesis 3. This correlation between assertiveness and subjective stress was not significant, and Hypothesis 4 was not supported.

The Moderator Model Hypothesis. Hypothesis 5 stated that subjective stress (Index of Clinical Stress) would interact with personality characteristics (Hardiness Scale and Assertion Inventory) to influence physical illness (Symptoms Illness Scale). Hypothesis 5 is the test of the moderator model proposed earlier in the study. In order to test this model, hierarchical regression analyses were conducted in which physical illness was regressed on to the personality characteristics, subjective stress, and the interaction of personality characteristics and subjective stress. The three subscales of hardiness (commitment, challenge, and control) were entered individually into separate hierarchical regression analyses. Thus, there were three separate tests for the moderating effects of subjective stress with hardiness on physical illness. However, there was only one test for the moderating effect of subjective stress with assertiveness on physical illness.

Hardiness. In the first analysis, subjective stress (Index of Clinical Stress) and challenge (Hardiness Scale) were entered simultaneously into the regression equation and these two variables did not account for a significant amount of physical illness. Then the interaction between subjective stress and challenge was entered into the regression equation, and this interaction did not account for a significant portion of the variance in physical illness.

This was repeated using commitment and control (Hardiness Scale) in place of the challenge. In all cases, none of the analyses were significant. In fact, the largest amount of the variance obtained was in the first analysis when commitment and subjective stress accounted for 10 percent of the variance (See Appendix L).

Assertiveness. Subjective stress and assertiveness were entered simultaneously in the regression equation. These two variables did not account for a significant amount of physical illness. Then the interaction between subjective stress and assertiveness was entered into the regression equation. It did not account for a significant amount of the variance in physical illness.

None of the multiple regression analyses for the moderator model were significant. Thus, the moderator model hypothesis was not supported.

Discussion

Comparison of Findings with Literature Review

The purpose of this study was to examine the relationships among personality characteristics, stress, and physical illness in a sample of undergraduate students. The findings are not consistent with literature supporting the relationship of personality characteristics, specifically hardiness and assertiveness, on physical illness. However, these findings do support literature that supports the association of these two personality characteristics and subjective stress.

Previous research supports the relationship of personality characteristics on physical illness even during times of high stress (Dreher, 1995). However since the moderator model was not supported using either personality characteristic, these findings are not consistent with previous research.

Furthermore, previous research supports a general relationship between personality characteristics and illness (Dreher, 1995). Such findings are also not supported by this study since there were no significant correlations between either personality characteristic and physical illness.

However, the evidence from this study did support findings that personality characteristics and subjective stress are related. In both cases, higher levels of hardiness and assertiveness were correlated with higher levels of subjective stress. This finding indicates that students with higher levels of hardiness and assertiveness experienced more subjective stress. Thus, the relationship between these personality characteristics and subjective stress is supported. However, these

findings are opposite of what was hypothesized at the beginning of the study since personality characteristics were hypothesized to be correlated with lower levels of subjective stress.

Although the findings from this study differ from previous studies' findings in that personality characteristics were not correlated with physical illness, this should be interpreted with caution. There are several alternative explanations and limitations that may explain the difference in the findings and the moderator model compared to previous research.

Alternative Explanations

There are several alternative explanations for the findings of this study. For example, the population used may have influenced findings. Findings may also be explained by the model and study design used.

One alternative explanation concerns the population studied. Most previous studies involved study participants that are acutely or chronically ill. Perhaps the effects of personality characteristics and subjective stress on physical illness are only measurable in cases where the study participants or at least some of the study participants suffer from an acute or chronic illness that was not seen do to truncated range of the data collected. The effect of personality characteristics and subjective stress on physical illness may not be detectable in a population with little to no physical illness.

Another alternative explanation may lie in the moderator model used. There may not have been enough variables considered when designing this model. Other variables such as genetic disposition, nutrition, and exercise habits may have a large impact on the variables in this study. If such variables were taken account for in the model, relationships might have been found.

On the other hand, this model is not correct at all. Another model in which personality characteristics are considered a buffer against subjective stress and then hence physical illness may better explain the relationship of these variables. A different model may also better explain the findings of this study. For example, if personality characteristics buffer the immune system from the effects of stress, a mediator model may better represent the relationship. In a mediator model,

people with the selected personality characteristics would experience less subjective stress. In the presence of the selected personality characteristics, they would not interpret experiences that could be seen as stressful as very stressful. Furthermore, the interaction of variables in the mediator model may explain why there was little variation in the study participants' low physical illness scores.

A final alternative explanation may be that the study design was weak due to the limitations. There were some limitations, especially the way physical illness was assessed, that may have limited the ability to detect significant relationships among the variables. Furthermore, the one-month time period that study participants were asked to evaluate their physical illness may not have been long enough to detect physical illness. The relationship of personality characteristics and subjective stress on physical illness may only be prevalent in long term situations.

Limitations

This study had several limitations in the following areas: instruments, research design, and target population. Overall the combined limitations may have weakened the significance of the findings.

Limitations with Instruments. There were limitations with the Symptoms Illness Scale used. It was probably not the optimum choice considering the population being studied. The Symptoms Illness Scale was designed specifically for the undergraduate population at the university the study took place. However, it may not have been sensitive enough to detect the presence of physical illness or over a long enough time frame to detect physical illness. In previous studies, more extensive surveys were used such as the Seriousness of Illness Survey. In others, study participants had been formally diagnosed with chronic conditions (Kobasa, Maddi & Kahn, 1982). Finally, in some previous studies, physical illness was assessed through personal interviews versus self-report surveys (Dreher, 1995). Finally, the Symptoms Illness Scale did not assess the affective component of physical illness. Ignoring the affective component of illness

limited the scope of information that could be collected regarding illness. A broader definition of illness may be more appropriate in future studies.

Limitations in the Research Design. Another possible limitation of this study is the research design. This was a self-report retrospective quantitative study with respect to physical illness and subjective stress. Students were asked to recall physical illness and subjective stress over a one-month time frame. The measure of hardiness and assertiveness pertain to present functioning. In the past both prospective designs and qualitative designs were used. These designs may have more strongly supported the hypotheses and the proposed moderator model. Furthermore, as mentioned previously asking study participants to evaluate their health over a longer period than just a month may also be beneficial.

Limitations with Population Studied. Finally there may have been some limitations with the population used. This population was very homogenous in nature. There was little variance in the physical illness data collected on students. Since there were few sick study participants, it was harder for any relationships of personality characteristics and subjective stress on physical illness to be detected.

However, there were some benefits to using a undergraduate population. The undergraduate population tends to include relatively healthy people. They were an excellent source of a well population to study the whether personality characteristics and subjective stress are related to physical illness.

Implications and Future Directions

The findings from this research imply that personality characteristics, especially hardiness and assertiveness, and subjective stress do not influence physical illness. Clinically this implies that spending time fostering these personality characteristics in undergraduate students may not be important to nurses and other health care professionals. Theoretically, these findings imply that the personality characteristics, hardiness and assertiveness, are not one of the factors influencing physical illness. However, since the findings of this study should be taken with caution, further

research is needed before theoretical and clinical implications can be made for undergraduate students and healthy populations in general.

In the future, it would be beneficial to use a different instrument for physical illness. The instruments that were used in the original studies would probably be the best. However, using an instrument with a high degree of sensitivity for the population being tested would be an improvement.

Besides making modifications in the instruments used, using a different population may be advantageous. If the effects of personality characteristics and subjective stress on physical illness are to be studied, a population with a wider range of physical illness than the undergraduate population tested may be needed to detect significant relationships. Perhaps, testing professionals in some field, as Oulette did in her original studies of hardiness, may be more beneficial (Dreher, 1995).

Finally some design changes may be beneficial. Conducting a prospective study examining study participants who stay well versus study participants who get sick while tracking personality characteristics and subjective stress levels would probably yield more information about the relationship of these variables than the current study yielded. Furthermore some previous studies use a qualitative method to collect data allowing for a more expansive collection of all variables. This design may prove to be more useful for this study especially considering that the only instruments found were either not used in previous studies or not designed for the undergraduate population.

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Appendix A

Consent form

Informed Consent for Participation in the Study: "The Effects of Personality Characteristics and Stress on Physical Illness"

By completing the questionnaires, I am giving my consent to be surveyed by a student at Illinois Wesleyan University for a research project. I understand that I will be part of a research study that focuses on the influence of personality characteristics on stress and illness. This study may give some insight as to how two characteristics, hardiness and assertiveness, may effect students' stress and illness.

I understand that I will be surveyed during my class. I will be asked to complete the forms in the packet. Filling out these forms should take approximately twenty-five to thirty minutes. I understand this is the only time I will be asked to participate.

I understand the study will not benefit me directly, nor are their personal risks to my participation. I have been informed that filling out these surveys is completely voluntary, and that I can refuse to answer the questions or terminate participation at any time. I have been told that the information I fill out on these surveys will not be given out to anyone; not even the researcher will know which answers are mine. I have been informed that my refusal or wish to terminate participation will have no effect on my grade in this class.

I understand that the results of this research will be given to me if I ask for them. The results will also be available to me at the IWU Student Research Conference on April 17th and through a sheet handed out to my class summarizing the results. The following individuals are involved with and/or reviewed this research project: Researcher - Carly Andersen, Faculty Supervisor - Dr. Donna Hartweg, Chair of the Institutional Review Board - Dr. Doran French. Finally, I know that I can contact Carly Andersen with any questions about the study or my rights as a study participant. Carly Andersen can be contacted at 556-2443 or at canderse@sun.iwu.edu.

Appendix B

Instructions Read to Study Participants

Introduction to Professor Reviewing Procedure:

Hello Dr. Brue (or Mr. Flowers), as we planned I am here today to obtain data from the students for my research. I would appreciate it if you could introduce me and explain that I am doing a senior research project looking at the health of college students. My research should be interesting to the students. Once you have introduced me, I will take over and you are free to leave. Thank you for allowing me to use your class.

Introduction to Study Participants:

Hello! My name is Carly Andersen. I am a senior nursing student here at Illinois Wesleyan University. I am interested in the health of college students. This year I am conducting research looking at two personality factors that may be associated with stress and illness in college students. I want to see if I can identify any trends between these variables. In order to do this, I would like you to fill out questionnaires which will assess your levels of hardiness, assertiveness, stress, and illness. Now I am going to read to you an informed consent form explaining your rights as a student. (Read consent).

I just have a few final directions for you. If you find some ambiguous questions that you are not sure how to answer, just answer to the best of your abilities. I will not be able to answer any questions. Please make sure to read the directions on each questionnaire. With some of the questionnaires, the higher the number is associated with a positive statement such as "completely true" where as on others the higher number is associated with a negative statement such as "never do it". Finally please fill out the forms in the order in which they presented in the packet. When you are done, put the questionnaires back in your packet and return them to me. Once you are done, feel free to ask me any questions regarding this research project. Thank you for you time.

Appendix C

Demographic sheet

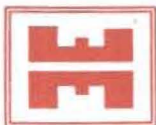
Please take a moment to complete the following questions.

When response is given, circle the appropriate response.

What is your major?

What year in school are you? Freshman Sophomore Junior
Senior

What is your gender? Male Female



INDEX OF CLINICAL STRESS (ICS)

Appendix D

Index of Clinical Stress

Name: _____

Today's Date: _____

This questionnaire is designed to measure the way you feel about the amount of personal stress that you experience. It is not a test, so there are no right or wrong answers. Answer each item as carefully and as accurately as you can by placing a number beside each one as follows.

- 1 = None of the time
- 2 = Very rarely
- 3 = A little of the time
- 4 = Some of the time
- 5 = A good part of the time
- 6 = Most of the time
- 7 = All of the time

1. ____ I feel extremely tense.
2. ____ I feel very jittery.
3. ____ I feel like I want to scream.
4. ____ I feel overwhelmed.
5. ____ I feel very relaxed.
6. ____ I feel so anxious I want to cry.
7. ____ I feel so stressed that I'd like to hit something.
8. ____ I feel very calm and peaceful.
9. ____ I feel like I am stretched to the breaking point.
10. ____ It is very hard for me to relax.
11. ____ It is very easy for me to fall asleep at night.
12. ____ I feel an enormous sense of pressure on me.
13. ____ I feel like my life is going very smoothly.
14. ____ I feel very panicked.
15. ____ I feel like I am on the verge of a total collapse.
16. ____ I feel that I am losing control of my life.
17. ____ I feel that I am near a breaking point.
18. ____ I feel wound up like a coiled spring.
19. ____ I feel that I can't keep up with all the demands on me.
20. ____ I feel very much behind in my work.
21. ____ I feel tense and angry with those around me.
22. ____ I feel I must race from one task to the next.
23. ____ I feel that I just can't keep up with everything.
24. ____ I feel as tight as a drum.
25. ____ I feel very much on edge.

Appendix E

Hardiness Scale

Hardiness Scale

Below are statements about life that people often feel differently about. Circle a number to show how you feel about each one. Read the item carefully, and indicate how much you think each one is true in general. There are right or wrong answers; just give your own honest opinions.

Not at all true 1	A little true 2	Quite true 3	Completely true 4
1. Most of my life gets spent doing things that are worthwhile	1	2	3 4
2. Planning ahead can help avoid most future problems	1	2	3 4
3. Trying hard doesn't pay, since things still don't turn out right	1	2	3 4
4. No matter how hard I try, my efforts usually accomplish nothing	3 4		1 2
5. I do not like to make changes in my everyday schedule	1	2	3 4
6. The "tried and true" ways are always best	1	2	3 4
7. Working hard doesn't matter, since only the bosses profit by it	1	2	3 4
8. By working hard you can always achieve your goals	1	2	3 4
9. Most working people are simply manipulated by their bosses	1	2	3 4
10. Most of what happens in life is just meant to be	1	2	3 4
11. It's usually impossible for me to change things at work	1	2	3 4
12. New laws should never hurt a person's pay check	1	2	3 4
13. When I make plans, I am certain I can make them work	1	2	3 4
14. It's very hard for me to change a friend's mind about something	1	2	3 4
15. It's exciting to learn something about myself	1	2	3 4
16. People who never change their minds usually have good judgment	1	2	3 4
17. I really look forward to my work	1	2	3 4
18. Politicians run our lives	1	2	3 4
19. If I am working on a difficult task, I know when to seek help	1	2	3 4
20. I won't answer a question until I am really sure I understand it	1	2	3 4
21. I like a lot of variety in my work	1	2	3 4
22. Most of the time, people listen carefully to what I say	1	2	3 4
23. Daydreams are more exciting than reality for me	1	2	3 4
24. Thinking of yourself as a free person just leads to frustration	1	2	3 4
25. Trying your best at work really pays off in the end	1	2	3 4
26. My mistakes are usually very difficult to correct	1	2	3 4
27. It bother me when my daily routine gets interrupted	1	2	3 4
28. It's best to handle most problems by just not thinking of them	1	2	3 4
29. Most good athletes and leaders are born, not made	1	2	3 4
30. I often wake up eager to take up my life wherever it left off	1	2	3 4
31. Lots of time, I don't really know my own mind	1	2	3 4
32. I respect rule because they guide me	1	2	3 4
33. I like it when things are uncertain or unpredictable	1	2	3 4
34. I can't do much to prevent it if someone wants to harm	1	2	3 4
35. People who do their best should get full support from society	1	2	3 4
36. Changes in routine are interesting to me	1	2	3 4
37. People who believe in individuality are only kidding themselves	1	2	3 4
38. I have no use for theories that are not closely tied to facts	1	2	3 4

39. Most days, life is really interesting and exciting for me	1	2	3	4
40. I want to be sure someone will take care of me when I'm old	1	2	3	4
41. It's hard to imagine anyone getting excited about working	1	2	3	4
42. What happens to me tomorrow depends on what I do today	1	2	3	4
43. If someone gets angry at me, it's usually no fault of mine			1	2
3 4				
44. It's hard to believe people who say their work helps society	1	2	3	4
45. Ordinary work is just too boring to be worth doing	1	2	3	4

Appendix F

The Assertion Inventory

The Assertion Inventory

Many people experience difficulty in handling interpersonal situations requiring them to assert themselves in some way, for example, turning down a request, asking a favor, giving someone a compliment, expressing disapproval of approval, etc. Go over the list and indicate for each item the probability or likelihood of your displaying the behavior if actually presented with the situation. For example, if you rarely apologize when you are at fault, you would mark a "4" for that item. Utilize the following scale to indicate response probability:

1= always do it, 2 = usually do it, 3= do it about half of the time, 4 = rarely do it, & 5= never do it

- | Response | Situation |
|-----------------|---|
| _____ | 1. Assuming you have a car, turn down a request to borrow your car |
| _____ | 2. Compliment a friend |
| _____ | 3. Ask a favor of someone |
| _____ | 4. Resist sales pressure |
| _____ | 5. Apologize when he/she is at fault |
| _____ | 6. Turn down a request for a meeting or a date |
| _____ | 7. Admit fear and request consideration |
| _____ | 8. Tell the person you are intimately involved with when he/she says or does something that bothers you |
| _____ | 9. Ask for a raise |
| _____ | 10. Admit ignorance in some area |
| _____ | 11. Turn down a request to borrow money |
| _____ | 12. Ask personal questions |
| _____ | 13. Turn off a talkative friend |
| _____ | 14. Ask for constructive criticism |
| _____ | 15. Initiate a conversation with a stranger |
| _____ | 16. Compliment a person you are romantically involved with or interested in |
| _____ | 17. Request a meeting or date with a person |
| _____ | 18. Your initial request for a meeting is turned down and you ask the person again at a later time |
| _____ | 19. Admit confusion about a point under discussion and ask for clarification |
| _____ | 20. Apply for a job |
| _____ | 21. Ask whether you have offended someone |
| _____ | 22. Tell someone that you like them |
| _____ | 23. Request expected service when such is not forthcoming, e.g. in a restaurant |
| _____ | 24. Discuss openly with the person his/her criticism of your behavior |
| _____ | 25. Return defective items, e.g. store or restaurant |
| _____ | 26. Express an opinion that differs from that of the person you are talking to |
| _____ | 27. Resist sexual overtures when you are not interested |
| _____ | 28. Tell the person when you feel he/she has done something that is unfair to you |
| _____ | 29. Accept a date |
| _____ | 30. Tell someone good news about yourself |
| _____ | 31. Resist pressure to drink |
| _____ | 32. Resist a significant person's unfair demand |
| _____ | 33. Quit a job |

- _____ 34. Resist pressure to “turn on?”
- _____ 35. Discuss openly with the person his/her criticism of your work
- _____ 36. Request the return of borrowed items
- _____ 37. Receive compliments in a positive fashion
- _____ 38. Continue to converse with someone who disagrees with you
- _____ 39. Tell friend or someone with who you work that something bothers you
- _____ 40. Ask a person who is annoying you in a public situation to stop

Appendix G

Symptoms Illness Survey

Symptoms Illness Survey

For the last month (30 days) please evaluate the following occurrences according to this scale:

- 0 = not at all**
- 1 = rarely; occasionally**
- 2 = some of the time**
- 3 = most of the time**
- 4 = all of the time**

How often have you had any of the following:

- 1. ____ A Cold**
- 2. ____ Stomach ache or vomiting**
- 3. ____ Sore throat**
- 4. ____ Flu or flu like symptoms**
- 5. ____ Fatigued or exhausted**
- 6. ____ Muscle or bone aching/pain (not due to physical activity)**
- 7. ____ Unusually bad case of acne or rash**
- 8. ____ Headache**
- 9. ____ Experienced the worsening of an ongoing medical condition (asthma, diabetes, etc.)**

Please place an X on the following scale to rate your overall health in the past month.

0	I----I----I----I----I----I----I----I----I----I	10
Your Worst		Your Best
Health Ever		Health Ever

Appendix H
Categorization of Majors

Major Category	Major	Number
Fine Arts	Art	4
	Music	2
	Vocal Performance	1
Science	Biology	3
	Computer Science	3
	Nursing	4
	Physics	2
	Psychology	6
Liberal Arts	Accounting	1
	Business Administration	5
	Double Major	5
	Elementary Education	2
	English	2
	French	1
	History	2
	International Studies	2
	Political Science	1
	Religion	1
	Risk Management	1
	Sociology	4
	Undecided	3

Appendix I

Frequency Tables of Demographics

A.

Frequency Table of Type of Major

Type of Major	Frequency	Percent
Fine Arts	7	12.7
Science	17	30.9
Liberal Arts	31	56.4
Total	55	100

B.

Frequency Table of Academic level

Academic level	Frequency	Percent
Freshman	11	20.0
Sophomore	8	14.5
Junior	26	47.3
Senior	10	18.2
Total	55	100

(Table continues)

C.

Frequency Table of Gender

Gender	Frequency	Percent
Male	18	32.7
Female	37	67.3
Total	55	100

D.

Frequency Table of Class

Gender	Frequency	Percent
Karate Class	33	60
Health Class	22	40
Total	55	100

Appendix J

Mean and Standard Deviation for Study Variables (n=55)

	Mean	Standard Deviation
Commitment	29.5	3.3
Control	30.8	3.9
Challenge	37.0	3.8
Assertiveness	103.2	15.6
Subjective Stress	30.6	12.8
Physical Illness (Part A)	7.4	3.5
Physical Illness (Part B)	6.6	2.0

Appendix K

Pearson r Correlations for Moderator Model Variables

	1. Subjective Stress	2. Commitment	3. Control	4. Challenge	5. Assertiveness	6. Physical Illness
2. Commitment	.328*	1.000	.599**	.222	.163	.201
3. Control	.392**	.599**	1.000	.423**	.172	.122
4. Challenge	.305*	.222	.423**	1.000	-.113	-.070
5. Assertiveness	.356**	.163	.172	-.113	1.000	-.083
6. Physical Illness	.217	.201	.122	-.070	-.083	1.000

* = $p < .05$ ** = $p < .01$

Appendix L

Multiple Regression of Personality Characteristics and Subjective Stress on to Physical Illness: A
Test of the Moderator Model

A.

Step 1: Entered Challenge and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Challenge			.263	1.870	.289
Subjective Stress			-.151	-1.071	.067
Total	.260	.068		2.240	.029

Step 2: Entered the product (interaction) of Challenge and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Challenge			-.163	-.423	.674
Subjective Stress			.219	.165	.869
Challenge X Subjective Stress			.049	.034	.973
Total	.260	.068		.824	.414

(Table continues)

B.

Step 1: Entered Commitment and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Commitment			.145	1.022	.312
Subjective Stress			.169	1.194	.238
Total	.257	.066		.361	.720

Step 2: Entered the product (interaction) of Commitment and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Commitment			.622	1.679	.099
Subjective Stress			1.870	1.521	.135
Commitment X Subjective Stress			-1.920	-1.392	.170
Total	.316	.100		-.613	.250

(Table continues)

C.

Step 1: Entered Control and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Control			.043	.294	.770
Subjective Stress			.200	1.360	.180
Total	.221	.049		1.212	.231

Step 2: Entered the product (interaction) of Control and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Control			.418	1.210	.232
Subjective Stress			1.359	1.389	.171
Control X Subjective Stress			-1.361	-1.198	.236
Total	.273	.075		-1.165	.543

(Table continues)

D.

Step 1: Entered Assertiveness and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Assertiveness			-.183	-1.285	.205
Subjective Stress			.282	1.978	.053
Total	.276	.076		2.988	.004

Step 2: Entered the product (interaction) of Assertiveness and Subjective Stress

Variables	<u>R</u>	<u>R²</u>	<u>Beta</u>	<u>F</u>	<u>p</u>
Assertiveness			-.350	-.908	.368
Subjective Stress			-.110	-.129	.898
Assertiveness X Subjective Stress			.482	.467	.643
Total	.283	.080		1.488	.143