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Correlation between Health and Stress

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CORRELATION BETWEEN HEALTH AND STRESS

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This study examined participants' level of stress and their perceived level of stress and success in school. The subjects were given the stress questionnaire in order to determine the level of stress they were experiencing and the frequency of health issues experienced during the previous year. The results of the study suggest that although level of stress may be similar between individuals, how they perceived the stress impacted their health level. Students who perceived the stress in a negative fashion were more likely to be sick than individuals who were less impacted by the stress. By identifying the correlation between health and stress, the study aimed to suggesting ways to minimize the negative impacts of stress to students.

ABSTRACT

To examine possible correlation and gender difference in health and stress level of college students, a questionnaire was given to each of the 50 subjects (25 male, 25 female) to survey the stress level and health of the subject. Statistical tests were performed on the group data collected. No significant correlation was found between stress and any aspect of the health subcategories, or in overall health. In 2 of the 8 health criteria, energy/fatigue ($t(48)=2.555$) and general health ($t(48)=2.127$), scores of the male subjects were found significantly higher than those of the female ones. No other significant gender difference was found.

Stress is very common in everyday life. It is the body's physiological response to a stressor. A stressor is any event or change (physical or psychological) that requires adaptation. There are two main categories of stressor: acute and chronic. Acute stressors are stressors that are short in duration, occurring infrequently and temporarily, which include things such as unpleasant films, under-stimulation/work under-load, over-stimulation/work overload, unexpected or uncontrollable noise, prestige or status loss, electric shock, uncontrollable situations, physical illness, surgery, threats to self-esteem, and traumatic experiences. Chronic stressors are stressors ones that last an extended period of time, which include things as sleep deprivation, daily "hassles", ongoing work over-load or under-load, role strains, or social isolation (Elliott and Eisdorfer, 1982). The difference between acute and chronic stressors has more to do with an individual's perception of stress or ability to handle stressful situation. Stress responses vary from person to person. However, the impact of stress is very similar for

all.

Stress can affect an individual's immune system. The immune system protects the body from disease organisms and other foreign bodies, known as antigens. The immune system consists of the *humoral* and the *cellular*. Specific types of cells function as agents of both parts of our immune system. White blood cells, called *leukocytes*, do most of the work. However, stress dramatically and quickly alters immune function to destroy a human being's health.

Stress can cause many psychological problems. Emotionally, stress can lead to feelings of depression, anxiety, and anger (McEwen & Stellar, 1993). One example of this is posttraumatic stress disorder (PTSD), an enduring and distressing emotional disorder that follows exposure to a severe helplessness or fear inducing threat. It is often associated with war. Stress can cause acute stress disorder, eating disorders, sleeping disorders and many other psychological disorders.

A typical response is often seen in individuals that are under stress for an extended period of time called general adaptation syndrome (GAS). According to Selye(1936, 1950), the body experiences several stages or phases in response to sustained stress. During the first phase, he noted a type of alarm response described earlier in reaction to an immediate danger or threat. He observed that most seem to pass into a stage of resistance in which various resources were mobilized to cope with the stress. Finally, if the stress were too intense or lasted too long, we may enter a stage of exhaustion in which our bodies suffer permanent damage or we may die.

Stress surely impacts the health of college students. Much research on stress and health in

college students has been conducted. Some results concluded that all college students deal with stress. Hudd (2000), for example, concluded that students with high levels of stress tend to perceive themselves as less healthy. Similarly, Goldman et. al., (1998) reported that being over-stressed can be harmful to students.

However, there are many more detailed questions on this topic that remain unanswered in existing research. For example, what kind of correlation between stress and health may exist among college students? What are the most common stressors for college students? How healthy do the students perceive themselves? Is there any gender difference? In order to answer the above questions, a study was conducted at Minnesota State University (MSU), Mankato. The research was orientated towards the health-stress relationship of college students. The results of the research was presented at the 2004 Undergraduate Research Conference (URC) of Minnesota State University, Mankato.

METHOD

Subjects

The subjects included 25 female and 25 male college students in MSU, Mankato. The subjects ranged from 19 to 31 years old.

Apparatus

A questionnaire was given to each subject. The first part of this survey was a stress questionnaire (Stress Survey, 2001) that required subjects to point out the stressors they have experienced in the past 12 months. The higher the score, the more stress the subject had experienced. The other part of the survey was a health questionnaire (RAND 36-Item Health

Survey 1.0, 1995), which tests 8 health criteria of college students. The criteria include physical functioning, role limitation due to physical functioning, role limitation due to emotional problems, energy/fatigue, emotional wellbeing, social functioning, pain, and general health. The higher the score, the healthier the subject was. A complete survey form is included in the appendices.

Microsoft Excel was used to analyze the data in two phases. The first phase was to convert the answer of each question on the survey into numerical scores. Once all the scores of a subject were obtained, it was entered into an Excel spreadsheet that contained all the scores of every subject. In the second phase the group data were analyzed using Excel.

Procedure

A questionnaire was first given to each subject. Instead of being administered by the researcher, the subject completes the questionnaire on a casual basis. The subject could take the questionnaire with him or her and return it a couple days later when finished. The questionnaire, in addition to the two major parts, collected gender, age, and year of school of the subject, while all other personal identifiers (such as name) were not collected.

A program that dealt with the stress section of the survey identified existing stressors for each subject and converted them into corresponding stress scores. The conversion table is given in the appendices. Then all the scores from individual stressor were added together by the program to obtain the stress score of the subject.

A second program dealt with the health part of the survey. For each subject, the program converted every question by its answer into a corresponding score. The conversion rule is

included in the appendices. The raw scores of each question were then divided into eight groups, corresponding to the eight criteria of health. The categorization table of the questions is included in the appendices. The scores of the questions within each criterion were averaged (over all the questions within that criterion) to produce the health score of that particular health criterion. Finally the scores from each of the eight criteria were averaged to obtain the overall health score of that subject.

The stress score, scores of 8 individual health criteria, and the overall health score of every subject were then logged into a spreadsheet in order to perform statistical tests. The spreadsheet containing the data is included in the appendices.

A Pearson correlation test was conducted for the overall health vs. stress, using the data of the male subjects, the female subjects, and all the subjects combined. Similar tests were also performed on the correlations between all the 8 individual health criteria and stress for male, female, and all the subjects.

T-tests were conducted on all the 8 health subcategories as well as overall health with male subjects' responses versus female subjects' responses to examine if there was gender difference in any of the 9 health scores.

For all the statistical tests, the size of the tests was chosen as .05.

RESULTS

There was no significant result found in any of the 27 correlation tests performed. The critical values are $R^2(df=24)=0.136$ and $R^2(df=48)=.080$. The results of the tests are summarized in table 1.

Table 1. Summary of the Correlation Tests

Test #	Test content
--------	--------------

1	Physics functioning vs. stress		
2	Role limitation due to physical health vs. stress		
3	Role limitation due to emotional problem vs. stress		
4	Energy/fatigue vs. stress		
5	Emotional wellbeing vs. stress		
6	Social functioning vs. stress		
7	Pain vs. stress		
8	General health vs. stress		
9	Overall health vs. stress		
Test #	Male subjects	Female subjects	All subjects
1	$R^2=.1090$	$R^2=.0387$	$R^2=.0009$
2	$R^2=.0285$	$R^2=.0150$	$R^2=.0304$
3	$R^2=.0121$	$R^2=.0666$	$R^2=.0284$
4	$R^2=.0351$	$R^2=.0490$	$R^2=.0086$
5	$R^2=.0205$	$R^2=.0422$	$R^2=.0278$
6	$R^2=.00044$	$R^2=.0002$	$R^2=.0002$
7	$R^2=.0187$	$R^2=.0451$	$R^2=.0133$
8	$R^2=.0089$	$R^2=.0033$	$R^2=.00005$
9	$R^2=.0081$	$R^2=.0285$	$R^2=.0105$

For the T-tests performed, significant gender difference was found in energy/fatigue ($t(48)=2.555, p<.05$) and general health ($t(48)=2.127, p<.05$), where scores of male subjects were higher in both cases. The critical value in this case is $t(48)=2.011$ for $p=.05$. A summary of the results of the T-tests is given in table 2.

Table 2. Summary of the T-tests

Test #	Test content	
Same as in table 1.		
Test #	t value	p value
1	0.428016	.670554
2	1.479903	.145433
3	-0.46291	.645521
4	2.554872	.013849
5	0.031615	.979410
6	0.553519	.582478
7	1.636602	.108255
8	2.127104	.038577
9	1.350589	.183160

The gender differences are also plotted in a graphic representation included in the appendices.

DISCUSSION

With the results of the statistical tests given, some of the questions addressed before can be answered. From the results, there is no evidence that stress significantly affects the health of college students. There are gender differences in two of the health criteria but not in the other six criteria, nor in the overall health score. Generally, men appear to be more energetic than women and report themselves healthier in terms of general health.

It was found that various stressors existed among college students. The most common stressors these subjects have are changes in sleeping habits, changes in social activities, increases in workload and changes in living conditions. It seems that these stressors are most likely to affect for college students and thus increase the stress level of the students.

The reason that a T-test for gender difference in the stress score was not performed was that the stress score of each subject was a weighted sum of the individual stressors that the subject experienced. More of the stressors, such

as death of a close family member, do not necessarily favor a certain gender. Therefore, there was no reason to look for which of the two genders were likely to experience more of these stressors.

There are some limitations to this study. Due to numerous reasons, it was difficult to locate a larger subjects pool. In addition, the questionnaire was not administered to all the subjects together during a given time. Generally speaking, 50 subjects are not considered sufficient. With a bigger sample, more accurate results have been collected. In addition, the age range of subjects was too broad, compares to the small sample size in the research. This age factor could possibly cause a large within-group variance that may overshadow any possible between-group differences. Also, subjects might underreport their problems, especially the male subjects. It is common for male subjects to present themselves as strong and confident, which is a less common practice for female students. The possible reason might be attributed to the fact that males generally exercise more than females.

APPENDICES

- I. The survey form used in this research
- II. Conversion table of the stress questionnaire
- III. Conversion table of the health questionnaire
- IV. Categorization table of the health questionnaire
- V. The spreadsheet containing data used for the statistical analysis
- VI. Graph of the gender difference in health criteria

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APPENDIX I

Stress and Health Survey

Dear Participant,

This statement is to disclose the privacy policy of this research. Your personal identifiers, such as, but not limited to, name, address, tech ID, social security number, would not be made available to the researcher. The only personal information that will be collected by the researcher is age and gender, and will not be released by the researcher as individual record. Only collective group data will be used in the result published.

APPENDIX II

Please answer the following questions first, then start with the survey.

Age:

Gender: F/M

Year: Freshman/Sophomore/Junior/Senior

Stress Survey:

Please check the following events in your life you have experienced in the past 12 months.

1. Death of a close family member _____
2. Death of a close friend _____
3. Divorce between parents _____
4. Jail term _____
5. Major personal injury or illness _____
6. Marriage _____
7. Firing from job _____
8. Failure of an important course _____
9. Change in health of a family member _____
10. Pregnancy _____
11. Sex problems _____
12. Serious argument with close friend _____
13. Change in financial status _____
14. Change in scholastic major _____
15. Trouble with parents _____
16. New girl-or boyfriend _____
17. Increase in workload at school _____
18. Outstanding personal achievement _____
19. First quarter/semester in college _____
20. Change in living conditions _____
21. Serious argument with an instructor _____
22. Lower grades than expected _____
23. Change in sleeping habits _____
24. Change in social activities _____
25. Change in eating habits _____
26. Chronic car trouble _____
27. Change in the, number of family get-togethers _____
28. Too many missed classes _____
29. Change of college _____
30. Dropping of more than one class _____
31. Minor traffic violations _____

APPENDIX III

RAND 36-Item Health Survey 1.0 Questionnaire Items

1. In general, would you say your health is:	
Excellent	1
Very good	2
Good	3
Fair	4
Poor	5
2. Compared to one year ago , how would you rate your health in general now ?	
Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

The following items are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?

(Circle One Number on Each Line)

	Yes, Limited a Lot	Yes, Limited a Little	No, Not limited at All
3. Vigorous activities , such as running, lifting heavy objects, participating in strenuous sports	[1]	[2]	[3]
4. Moderate activities , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	[1]	[2]	[3]
5. Lifting or carrying groceries	[1]	[2]	[3]
6. Climbing several flights of stairs	[1]	[2]	[3]
7. Climbing one flight of stairs	[1]	[2]	[3]
8. Bending, kneeling, or stooping	[1]	[2]	[3]
9. Walking more than a mile	[1]	[2]	[3]

10. Walking several blocks	[1]	[2]	[3]
11. Walking one block	[1]	[2]	[3]
12. Bathing or dressing yourself	[1]	[2]	[3]

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

(Circle One Number on Each Line)

	Yes	No
13. Cut down the amount of time you spent on work or other activities	1	2
14. Accomplished less than you would like	1	2
15. Were limited in the kind of work or other activities	1	2
16. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

(Circle One Number on Each Line)

	Yes	No
17. Cut down the amount of time you spent on work or other activities	1	2
18. Accomplished less than you would like	1	2
19. Didn't do work or other activities as carefully as usual	1	2

20. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

(Circle One Number)

Not at all 1

Slightly 2

Moderately 3

Quite a bit 4

Extremely 5

21. How much **bodily** pain have you had during the **past 4 weeks**?

(Circle One Number)

None 1

Very mild 2

Mild 3

Moderate 4

Severe 5

Very severe 6

22. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

(Circle One Number)

Not at all 1

A little bit 2

Moderately 3

Quite a bit 4

Extremely 5

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the **past 4 weeks** . . .

(Circle One Number on Each Line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
23. Did you feel full of pep?	1	2	3	4	5	6
24. Have you been a very nervous person?	1	2	3	4	5	6

25. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
26. Have you felt calm and peaceful?	1	2	3	4	5	6
27. Did you have a lot of energy?	1	2	3	4	5	6
28. Have you felt downhearted and blue?	1	2	3	4	5	6
29. Did you feel worn out?	1	2	3	4	5	6
30. Have you been a happy person?	1	2	3	4	5	6
31. Did you feel tired?	1	2	3	4	5	6

32. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?

(Circle One Number)

All of the time 1

Most of the time 2

Some of the time 3

A little of the time 4

None of the time 5

How TRUE or FALSE is each of the following statements for you.

(Circle One Number on Each Line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
33. I seem to get sick a little easier than other people	1	2	3	>4	5
34. I am as healthy as anybody I know	1	2	3	4	5
35. I expect my health to get worse	1	2	3	4	5

36. My health is excellent	1	>2	3	4	5
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APPENDIX IV

ITEM NUMBERS	Change original response category (a)	To recoded value of:
1,2,20,22,34,36	1 ----- >	100
	2 ----- >	75
	3 ----- >	50
	4 ----- >	25
	5 ----- >	0
3,4,5,6,7,8,9,10,11,12	1 ----- >	0
	2 ----- >	50
	3 ----- >	100
13,14,15,16,17,18,19	1 ----- >	0
	2 ----- >	100
21,23,26,27,30	1 ----- >	100
	2 ----- >	80
	3 ----- >	60
	4 ----- >	40
	5 ----- >	20
	6 ----- >	0
24,25,28,29,31	1 ----- >	0
	2 ----- >	20
	3 ----- >	40
	4 ----- >	60
	5 ----- >	80
	6 ----- >	100
32,33,35	1 ----- >	0
	2 ----- >	25
	3 ----- >	50
	4 ----- >	75
	5 ----- >	100

(a) Precoded response choices as printed in the questionnaire.

Scale	Number Of Items	After Recoding Per Table 1, Average The Following Items:
Physical functioning	10	3 4 5 6 7 8 9 10 11 12
Role limitations due to physical health	4	13 14 15 16
Role limitations due to emotional problems	3	17 18 19
Energy/fatigue	4	23 27 29 31
Emotional well-being	5	24 25 26 28 30
Social functioning	2	20 32
Pain	2	21 22
General health	5	1 33 34 35 36

APPENDIX V

Gender	Age	Stress score	physical functioning	physical health	role limitations due to physical health	role limitations due to emotional problems	energy/fatigue	emotional well-being	social functioning	social pain	general health	overall health
F	21	245	20	0	0	25	36	75	70	20	30.75	
F	31	185	90	100	100	30	60	87.5	77.5	90	79.38	
F	19	203	85	100	66.67	45	72	75	90	50	72.96	
F	21	186	60	50	33.33	60	44	75	77.5	60	57.48	
F	30	239	100	100	100	50	72	100	100	85	88.38	
F	20	58	90	100	100	50	52	87.5	100	85	83.06	
F	22	288	50	75	100	10	92	25	22.5	35	51.19	
F	22	264	85	100	100	35	72	100	90	55	79.63	
F	23	250	95	100	100	60	80	87.5	77.5	40	80	
F	19	488	70	100	0	40	68	75	57.5	65	59.44	
F	24	0	100	100	100	60	68	100	90	65	85.38	
F	26	95	95	50	66.67	50	56	62.5	77.5	35	61.58	
F	19	245	100	100	100	60	64	75	100	55	81.75	
F	25	131	100	100	100	85	92	100	77.5	80	91.81	
F	21	225	100	0	33.33	50	64	75	67.5	25	51.85	
F	21	235	80	100	100	40	64	100	57.5	65	75.81	
F	23	25	100	100	100	55	88	100	100	55	87.25	
F	21	118	95	100	100	60	84	75	77.5	75	83.31	
F	24	115	95	100	0	30	52	75	100	65	64.63	
F	23	249	100	75	0	60	96	75	100	80	73.25	
F	22	438	80	100	33.33	40	88	100	100	75	77.04	
F	19	414	100	25	100	65	76	100	90	80	79.5	
F	24	275	100	100	100	60	92	100	100	100	94	
F	21	188	80	75	100	60	68	75	77.5	55	73.81	
F	21	180	25	25	0	45	48	37.5	67.5	40	36	

APPENDIX V (continued)

Gender	Age	Stress score	physical functioning	physical health	physical due to health	physical due to prb	energy /fatigue	emotional well being	social functioning	social pain	general health	overall
M	22	63	95	100	33.33	55	52	100	57.5	65	69.73	
M	21	136	90	100	100	55	52	75	100	65	79.63	
M	30	229	60	0	0	55	68	50	65	70	46	
M	26	127	100	100	100	80	80	100	90	80	91.25	
M	21	106	25	100	100	80	96	100	90	100	86.38	
M	29	60	80	100	100	60	92	87.5	100	80	87.44	
M	23	267	95	100	66.67	25	28	50	65	15	55.58	
M	20	310	100	100	100	80	76	100	100	100	94.5	
M	31	355	100	100	100	60	80	100	100	70	88.75	
M	21	102	55	75	66.67	40	76	62.5	77.5	50	62.83	
M	23	171	100	100	66.67	75	80	75	77.5	75	81.15	
M	22	73	90	75	100	50	76	100	70	85	80.75	
M	22	66	100	100	0	55	28	50	80	70	60.38	
M	20	139	85	100	100	45	76	100	90	35	78.88	
M	28	37	95	100	0	65	72	100	90	85	75.88	
M	24	0	60	100	100	35	44	75	100	80	74.25	
M	24	111	95	100	0	70	88	87.5	100	70	76.31	
M	23	121	95	100	100	70	76	100	100	80	90.13	
M	23	403	100	100	33.33	55	72	100	90	85	79.42	
M	21	164	95	100	66.67	50	92	100	100	85	86.08	
M	25	336	95	50	66.67	80	100	100	100	100	86.46	
M	22	111	100	100	100	40	48	100	100	45	79.13	
M	26	138	100	100	33.33	75	76	75	100	95	81.79	
M	21	364	100	100	0	75	60	62.5	100	85	72.81	
M	27	103	50	75	66.67	80	64	62.5	90	75	70.4	

APPENDIX VI

