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## An Investigation into the Effects of Social Network Strength and Stress Level on Cardiovascular Responses in College Students

The present study investigated the effects of strength of social network on physiological stress during a cognitive task. Participants were randomly assigned to a timed or untimed word search task. The dependent variables were heart rate and participants' perceptions of the difficulty of their word search task. Participants in the high stress condition reported performing significantly worse on the word search task than those in the low stress condition. Participants perceived the task to be less difficult when in the high social network group as compared to the low social network group. While there were no significant findings for the heart rate measure, there was an interesting pattern. For the high stress condition, participants with a low social network had slightly higher heart rates than participants with a high social network.

A low level of social network leads to poor mental and physical health (Berkman and Glass, 2000). However, the specific ways that social network affects health have been disputed. Investigators agree that low amounts of social support lead to high rates of illness and fatality, but differ in their views on the following inquiries: *What is stress and what are its causes? What is the definition of a diverse social network? What is the relationship between social network and health?* These three questions are the main focus in the review of literature concerning social network and health.

### **What is stress and what are its causes?**

Stress is a stimulus that causes sadness, low self-confidence and overall decreased health

condition (Kanner, Feldman, Weinberger, & Ford, 1987). Stress stimuli are considered to be events that interfere with life. Lazarus and Cohen (1977) illustrated three main types of stressors: major changes affecting large numbers of individuals, major changes affecting one or more individuals, and daily hassles. Situations thought to be out of one's control, such as natural disasters and acts of terrorism, are examples of major changes affecting large numbers of individuals. Examples of major changes affecting a few individuals are the death of a parent, being laid off from work, divorce or a life-threatening illness. Lazarus and his research team defined daily hassles as minor annoyances such as one's cat getting sick on the rug or having an argument with a friend.

In addition to the different types of stressors, research has indicated that there are differences between chronic and acute demands of a stressor (Lazarus & Folkman, 1984). Chronic demands are stressful events that occur for a long period of time, such as a persistent cough. They described acute demands as stressful events that occur in the present moment or immediate past. Examples are moving and taking an exam in school. In small amounts, acute demands can be exhilarating. However, too much acute stress leads to exhaustion in the form of increased physical and emotional stress levels (Lazarus & Folkman, 1984). Other differences include the degree to which an individual believes he or she can predict an event, as well as the degree of attraction or aversion one feels toward an object or experience.

How we react to stressors is especially influenced by cognitive appraisal (Lazarus & Folkman, 1984). Cognitive appraisal is the process of evaluating an event to determine whether it would facilitate one's well-being. It is evaluative in that its focus is on meaning of the stressor. Appraisal occurs continuously throughout life. There are two types of appraisal: primary and secondary. Two types of primary appraisal are benign-positive and stressful (Lazarus & Folkman, 1984). Benign-positive appraisals occur if the outcomes of an experience are interpreted as positive, that is, if one's interpretation of an experience aids in the maintenance or enhancement of well-being. These appraisals are characterized by emotions such as joy, excitement, love, happiness, or peacefulness. However, completely benign-positive appraisals without some degree of uneasiness are rare; individuals always consider the possibility that something will go wrong, which in turn creates anxiety.

The second kind of appraisal, stress appraisal, generates even more anxiety (Lazarus & Folkman, 1984). During this second type of appraisal, individuals assess the potential harm, loss or threat of a stressor. In harm or loss, some damage to the person has always been sustained. The anticipation of an injury, as well as aware-

ness that one's self-esteem has been damaged, are examples of this type of appraisal. Experiences in life which are most damaging are those in which central commitments are lost, such as the loss of a loved one.

Threat involves harms or losses that have not yet taken place but are anticipated (Lazarus & Folkman, 1984). Even when a harm/loss has occurred, it is always fused with threat because every loss is also laden with negative implications for the future. Threat can be positive, as it may motivate an individual to cope with the anticipation one feels. Threat appraisal illustrates that individuals can anticipate future events. This allows them to work through some of their difficulties in advance, such as anticipating grief that one will feel after experiencing from the loss of a loved one to a terminal disease (Lazarus & Folkman, 1984).

Secondary appraisal occurs when one is in danger and something must be done to manage the situation (Lazarus & Folkman, 1984). Secondary appraisal is an important component of every stressful encounter and involves evaluating alternative approaches for stress management. An example of a secondary appraisal would be asking oneself if riding a horse is likely to lead to injury, as well as asking oneself whether one has the available resources to cope. The authors suggest that secondary and primary appraisals interact with each other in shaping the degree of stress of the emotional reaction.

How one responds to stress may also be attributable to a concept known as stress-reactivity (Cohen & Hamrick, 2003). Stress reactivity is a stable physiological response to a stressor. It can lead to variability in stress-induced susceptibility to developing a cold. Individuals who showed a disposition toward greater cardiovascular response were considered to be more likely to develop stressor-induced heart disease and hypertension (Cohen and Hamrick, 2003).

Stress-reactivity to stressors is also characterized by hypothalamic-pituitary-adrenal axis activation (HPA) and greater sympathetic nervous system (SNS) (Cohen & Hamrick, 2003). It is also associated with greater immune

suppression. The more stress reactors present when exposed to a stressor, the greater the risk of developing an infectious illness. Individuals inclined to respond to stressors with high levels of activation of SNS and HPA have been shown to be at greater risk for illness when exposed to a stressor. Specifically, they found that cardiovascular responses are indicators of an individual's vulnerability to stressor-induced risk for contracting an infectious disease. An example of a cardiovascular response is heart rate. Since heart rate was found to be a stable measure in this past research, it is the main dependent measure of the present study.

Stressors have also been evident in laboratory settings which are highly generalizable to, and hence representative, of, natural occurrences. Feldman, Cohen, Hamrick and Lepore (2004) found that the silent preparation period preceding a stressor such as a public speaking task was sufficient to elicit heightened cardiovascular response. Those in the stress condition had increased cardiovascular responses during the preparation period. Therefore, anticipation of a stressor elicits response.

Feldman et al. (2004) took into consideration the behavioral demands of a public speaking task in the contribution to physiological response of heart rate. This study provided evidence that stressor anticipation, or perception of the upcoming stressor, was sufficient to elicit physiological response that was comparable to or exceeded those typically observed during the task itself. Specifically, increases in cardiovascular response as an effect of preparing for a speech were found to be due to the physiological reaction of negative emotions, which was a sign of the difficulty with the task (Felman et al., 2004). Physiological response is not only affected by various stressors but may be mediated by the presence or absence of a diverse social network.

### **What is the definition of a diverse social network?**

Individuals with a diverse social network have social support from many outlets, as they

are married, interact with family members, friends, neighbors, fellow workers and belong to social and religious groups (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997). The Social Network Index (SNI; Cohen et al., 1997) is a measure that assesses participation in twelve types of social relationships: spousal, parental, parents-in-law, children, close family members, neighbors, friends, workmates, schoolmates, volunteer groups, social/recreational/professional groups and religious groups. Based on the work of Cohen and his research team, a relationship can be defined as an affiliation with another human being in which two individuals speak on the phone or in person at least once every two weeks.

Social network has not always been easy to define, however. Cohen, Mermelstein, Kamarck, and Hoberman (1985), who defined social network as a resource of support that is provided by other individuals, indicated that there are many social network measures. Therefore, it is difficult to create one prototypical definition. For example, studies using measures assessing the structure of social networks, such as "How many friends do you have?" are seldom distinguished from those addressing the functions that networks might serve, such as "Do you have someone you can talk to about personal problems?" (Cohen et al., 1985, p. 74). In fact, in many cases, structural and functional items are positioned collectively into one support index, resulting in scores that have little conceptual meaning.

In the framework of these restrictions, the researchers have developed their own social support scale known as the Interpersonal Support Evaluation List (ISEL; Cohen et al., 1985). This instrument created four categories of support functions served by interpersonal relationships: tangible support, appraisal support, self-esteem support and belonging support. Tangible support is instrumental aid and appraisal support is the availability of someone to talk to about one's problems. Self-esteem support is the availability of a positive comparison when comparing oneself with others and belonging support is the



availability of people with whom one can do things. Increasing interest has been directed towards the role social network plays in protecting individuals from the physiological effects of stress (Cohen, Clark, & Sherrod, 1986).

### **What is the relationship between social network and health?**

Cohen et al. (1985) developed the stress-buffering hypothesis, which asserted that social support protects individuals from the physiological effects of stress. The buffering effect of social support is cognitively mediated which means that support functions by influencing one's appraisal of stressful events (Cohen et al., 1986). Potentially stressful events are perceived as less stressful when diverse social support influenced perceived availability to cope. A measure of the perceived availability of support is a valid indicator of its buffering effects because the appraisal of stress is based on an individual's *beliefs* or perceptions about available support as opposed to its actual availability.

An example of a measure assessing perceived stress was developed by Cohen et al. (1986) who administered the Perceived Stress Scale, a fourteen-item self-report measure designed to assess the degree to which life experiences are appraised as stressful. Half of the statements indicated low stress and the remaining half indicated high stress. On a five-point scale ranging from 1 indicating "never" to 5 indicating "very often," respondents indicated how often they have felt or thought, during the previous month, in the way indicated by the statement. The PSS included questions designed to investigate the degree to which respondents found their lives to be unpredictable and uncontrollable and included questions about current levels of physiological stress (Cohen et al., 1986). Buffering effects of social support were found for the perceived availability of support scale and for each of the subscales that represented psychological forms of support but not for the tangible support subscale. The poor performance of tangible support was due to the fact that it was found that college students require

little tangible aid. Cohen and his research team found that appraisal, self-esteem and belonging support are, in general, more useful in coping with stressful experiences.

One way in which appraisal support, self-esteem support and belonging support have been used when encountered with a stressful event was illustrated by Cohen et al. (1986). High levels of stress were positively associated with physiological response under low levels of support but unassociated under high levels of support. The stress-buffering effects of social support were correlated with skills such as social competence (the ability to cope with stressful events and sustain social support) and self-disclosure (a form of appraisal support in which an individual has the perception of availability that other people will talk to him/her about his/her problems). Buffering effects were found for the perceived availability of support scale and for each of the subscales that represent appraisal support, self-esteem support and belonging support.

Past research has thus emphasized the physiological and perceived effects of stress. Social network strength has been shown to moderate stress as measured by cardiovascular response and perceived availability of social support. Given this, the present study investigated the effects of social network strength and stress level on heart rate and perceptions of stress to an acute experimental stressor. Experimenters exposed participants to timed and untimed word search puzzles while monitoring their heart rate. Given that cardiovascular reactivity has been found to be a stable marker of vulnerability to stressor-induced risk for infectious disease (Cohen & Hamrick, 2003), our hypothesis was based on the stress-buffering theory (Cohen et al., 1985) that the larger one's social network, the lower his or her stress response. We hypothesized that for the high stress condition, participants with a high social network would have a lower heart rate than those with a low social network. We also hypothesized that for the low stress condition, there would be no real differences in heart rate between high and low social

network groups.

## Method

### Participants

Thirty-two students (seven men and twenty-five women) from a small liberal arts school in northeastern Pennsylvania participated in the experiment. The majority of the participants were freshman ( $N=20$ ). There were seven sophomores, four juniors and one senior. In exchange for their participation in the experiment, participants received credit in their course.

### Design

A 2 (Level of social network: high level of social network vs. low level of social network) X 2 (Stress manipulation: timed vs. untimed puzzle) between-subjects design was used. Participants were categorized as high or low social network as created by a median split of scores in the Social Network Survey (Cohen, Clark, & Sherrod, 1986). Scores greater than or equal to 36 were categorized as high social network, whereas those with a collective score of less than 36 were categorized as low social network. The dependent variables were heart rate from baseline and participants' perceptions of stress and the task.

### Materials

#### a) Matching Task

The matching task was composed of nine pairs of matching objects. One of the objects on the left side of the page was best associated with one of two objects on the right side of the page. An example of a matched pair of objects was a bat on the left side of the page matched with a baseball on the right side of the page.

#### b) Word search task – Timed/High-Stress and Untimed/Low-Stress (no researcher present) condition

The word searches consisted of the same difficult words with “-ing” such as “amazingly,” “appetizingly” and “amusingnesses.” Words can go horizontally, vertically and diagonally in all eight directions. Words may also overlap and

share one or more letters. The timed, high-stress condition was given a six-minute time limit to complete the word search. The experimenter sat in the room and watched these participants complete the word search. In the untimed/low-stress condition, participants had the same six-minute time limit but the experimenter left the room for that duration of time.

#### c) Perceptions of Task Questionnaire

A Perceptions of Task questionnaire was then distributed to each participant to evaluate the subjective difficulty of the word search task, how well participants thought they did on the word search, how stressful participants found the word search to be and to what extent participants felt that they were under time pressure. Respondents were asked to rate their responses to difficulty of the word search task using a five-point scale, with 1 indicating “Very difficult” and 5 indicative of “Very easy.” Respondents were asked to rate their responses to how stressful participants found the word search to be using a scale from 1 to 5, with 1 indicating “Very Stressful” and 5 indicative of “Not at all stressful.” Respondents were asked to rate their responses to what extent participants felt that they were under time pressure using a scale from 1 to 5, with 1 indicating “Not at all” and 5 indicative of “To a great extent.”

#### d) Social Network Survey

The social network survey was adapted from the college-version Interpersonal Support Evaluation List developed by Cohen et al. (1985). The 48-item survey was distributed to each participant. The survey assessed the perceived availability of potential social resources. Half of the items were positive statements about social relationships (e.g., “There are several different people with whom I enjoy spending time”) and half were negative statements about social relationships (e.g., “I feel that there is no one with whom I can share my most private worries and fears”). Participants were asked to indicate whether each statement was “probably true” or “probably false” about themselves. Items

cover the realm of supportive social resources that could potentially facilitate coping with stressful events. While the original ISEL (Interpersonal Support Evaluation List) is divided into the four types of appraisal support, in our experiment we computed only one score for each participant.

### **Apparatus**

A Biopac Student lab software MANBSL3S was used to measure heart rate in beats per minute (bpm). Participants were attached to the device through electrodes clipped to the right and left legs and right forearm of each participant.

### **Procedure**

Participants were individually instructed that the psychology department has recently received new equipment and we, as experimenters would like to test this equipment on them. Each participant was then attached to the Biopac. Two electrodes were placed on the inside of the right and left legs just above the ankle bone. One electrode was placed on the right anterior forearm just above the wrist.

Once each participant was seated and in a relaxed state, they were instructed to breathe deeply while the machine calibrated their heart rate. We calibrated the heart rate measure for ten seconds to establish a stable baseline. Participants were then instructed to complete a matching task, the purpose of which was to study gender differences in performance. Once administered the matching task, the experimenter pressed record to start recording heart rate. The matching task was composed of nine pairs of matching objects. Participants were instructed to draw a line between the object on the left that matched with the object on the right (e.g., a baseball and a bat as compared to a baseball and a car).

Participants were then randomly assigned to either the timed or untimed word search task and instructed to complete the respective task. A respiratory transducer was used to mark the start of the word search task. During the timed word

search, participants were instructed that they would have six minutes to complete the word search, to find as many words as possible, that this task was being used as a gender comparison to determine which gender performs more efficiently and that when the time was up, they must stop. The instructor sat in the same room as participants in the timed condition. An egg timer was used to measure the timed word search.

During the untimed word search, each participant was instructed to complete the word search, to try to find as many words as he or she could and to take his or her time in completing. The experimenter left the room for the six-minute duration of the untimed task. After completing one of the word search tasks, the investigator detached the Biopac device from the participant and instructed him/her to complete a Perception of Stress questionnaire. Afterwards, participants were asked to complete a Social Network Survey. Participants were then debriefed, thanking them for participating in the study, and asked if they had any questions. Participants were then told the true purpose of the study.

## **Results**

### **Heart Rate**

An analysis of variance was done to determine if social network strength and stress manipulation affected heart rate. There were no significant main effects for social network strength ( $F(1, 28) = 1.20, p = 0.28$ ) or the stress manipulation ( $F(1, 28) = 0.01, p = 0.93$ ). There was also no interaction effect for heart rate by social network strength and stress manipulation ( $F(1, 28) = 2.82, p = 0.10$ ). While there were no significant findings, there was an interesting pattern. For the high stress manipulation, participants with a high social network had slower heart rates than participants in the low social network. However, in the low stress manipulation, participants in the high social network had a higher heart rate than participants in the low social network. Means and standard deviations for heart rate by social network strength and stress manipulation can be found in Table 1.



### Perception of Stress and Task

Separate ANOVAs were computed for perception of stress and task. For perception of stress, there were no significant main effects for social network strength ( $F(1, 28) = 2.56, p = 0.12$ ) or the stress manipulation ( $F(1, 28) = 0.09, p = 0.76$ ), nor was there an interaction effect for perception of stress by social network strength and stress manipulation ( $F(1, 28) = 1.26, p = 0.27$ ). Participants in the high stress condition perceived slightly more stress across social network strength. Participants with high social networks perceived less stress across stress manipulation.

A two-way between-subjects ANOVA revealed a significant main effect of social network strength for difficulty of the word search task,  $F(1, 28) = 6.41, p = .02$ . Participants perceived the task to be less difficult when in the high social network group as compared to the low social network group. Means and standard deviations for difficulty of word search by social network strength and stress manipulation can be found in Table 2.

A two-way between-subjects ANOVA revealed a main effect of stress manipulation for perception of performance on task,  $F(1, 28) = 4.25, s = .05$ . Participants in the high stress condition reported performing significantly worse on the word search task than those in the low stress condition. Means and standard deviations for perception of performance on task by social network strength and stress manipulation can be found in Table 3.

### Discussion

In the present experiment, we tested the effect that social network strength and stress manipulation had on an individual's heart rate. No significant effects were found for our heart rate results. However, we found an interesting pattern. Data from participants in the high-stress manipulation were consistent with our predictions because mean patterns were in the right direction for low social network; low social network participants had increased heart rate in the high stress manipulation. However, data from

low-stress participants was not consistent with our predictions. In the low-stress manipulation, high social network participants had a faster heart rate (bpm) than low social network participants. One reason for the heart rate results was because the stress manipulation was not strong enough. The weak manipulation check was due to the fact that the perceived time pressure manipulation check question did not appear to lead to great stress. Another reason for the weakness of the stress manipulation was because the perception of stress question had no significant main effects.

The time pressure manipulation check question, "To what extent did you feel that you were under time pressure?" did not appear to lead to great stress. In other words, no significant effects were found. While low social network participants reported greater perceived time pressure than high social network participants in the high-stress manipulation, low social network participants perceived greater time pressure than high social network participants in the low-stress condition. The perception of stress question, "How stressful did you find the word search to be?" also had no significant main effects. Participants in the high stress condition perceived slightly more stress across social network strength. Participants with high social networks perceived less stress across stress manipulation.

Perhaps the stress manipulation was not strong enough, as evidenced by the lack of main effects for both the perception of stress and the time pressure manipulation check, because the students who participated in this experiment did not believe that there were any severe consequences for completing the experiment with minimal effort. The incentive of participation in the experiment was L.O.C. (Learning Outside the Classroom) extra credit and while this was a mandated requirement, participants knew that their results would not be graded and that they would not be punished even in the form of losing credit for leaving at any time during the experiment. Therefore, one way to make the stress manipulation stronger could be to decrease the amount of time allotted for the timed word



search task from six minutes, and to create consequences for failure on the task such as losing credit. Experimenters could also ask more specific questions in the Perceptions of Task survey such as those targeting the subcategories (appraisal support, self-esteem support and belonging support) of the social network scale, such as self-respect and social approval. This suggestion is supported by previously mentioned findings that targeting more specific threats associated with the word-search task such as the anticipated loss of self-respect and social approval (Folkman and Lazarus, 1980) instead of broad questions in the questionnaire will increase the likelihood that participants would appraise the high-stress task as more threatening and pressured when asked about specific negative outcomes opposed to being asked to report on general feelings that negative outcomes occurred. This will, in turn, increase the strength of the stress manipulation. Another way in which to make the manipulation check stronger would be to replicate a more stressful task or situation, similar to Feldman et al.'s (2004) public speaking task. Public speaking is a fairly common requirement for some college classes and therefore the consequences of insufficient completion of the task will be more relevant and serious to the student, such as a poor grade and loss of respect by peers and faculty.

Findings of the "difficulty of the word search" question were consistent with our predictions. Participants with a high social network perceived the task to be less difficult than participants with a low social network across both timed and untimed word search tasks. This finding was consistent with our predictions because the buffering effect of social support allows individuals with a high social network to appraise the stressfulness of a situation with the perception that they can cope with stressful events (Cohen et al. 1986).

Findings of perception of performance were also consistent with our predictions. Participants in the high stress condition reported performing significantly worse on the word search task than those in the low stress condition.

How we react to stressors is heavily influenced by cognitive appraisal (Lazarus & Folkman, 1984) that is based on perception of support and not the actual support itself (Cohen et al., 1986). Stress is a stimulus that causes sadness, low confidence and overall decreased health condition (Kanner, Feldman, Weinberger, & Ford, 1987). Acute stressors elicit increases in the number of natural killer cells and in natural killer cytotoxicity, or the production of toxins in living cells (Cohen & Hamrick, 2003). In consequence, how we react to stress has been found to be due to the physiological reaction of negative emotions which is a sign of difficulty with the task (Feldman et al., 2004).

There are many implications of these findings. First, a quasi-experiment such as this needs to possess reactivity and internal validity, double blind procedures, and manipulation checks. Reactivity refers to changes in the subjects' behavior simply because they are being studied. For example, some individuals get nervous when a doctor or nurse takes their blood pressure, and as a result their blood pressure rises. Reactivity poses a distinct threat to internal validity because we do not know what caused the outcome: treatment effects or reactivity. The experimental laboratory is probably the most reactive because people have come for an experiment and they know their behavior is being watched. That is why we used deception. In so doing, we tried to divert subject attention so that the true behavior under study was not altered. Demand effects, in which subjects or respondents "follow orders" or cooperate in ways that they almost never would under their routine daily lives, are also possible. For example, laboratory subjects would do virtually anything an experimenter asked them to do. Since we told each participant to complete the questionnaires, they simply did so without any concept of the repercussions of their actions. That may be a reason why the stress manipulation was not strong enough. Social Desirability effects are also possible. Subjects may become nervous about being monitored, or evaluation apprehension. When people become anxious, physiological

indicators, such as heart rate measured in our experiment, change. If people are slightly anxious, they may do better on tests, performance, or assessments. However if people are very anxious they will almost certainly do worse. This may be why there were no significant effects for perception of stress by social network strength and stress manipulation because the word search task was so difficult that both conditions shut down and were unable to do well regardless of their social network or whether the task was timed or untimed.

People may try to appear smarter, more attractive, or more tolerant than they normally are. Paper and pencil questionnaires are especially prone to these effects because often the answers are not checked for their truthfulness. Furthermore, most people and groups (who allow you to study them at all) try to cooperate with researchers. But some try to discover the purpose of the intervention and thwart it. Social Reactance effects refer to boomerang effects in which individuals or groups deliberately deviate from study procedures. This happens more among college students, and others who suspect that their autonomy is being threatened.

One threat to external validity is the issue of the reality of the study setting. In many cases, such as studies of classrooms or online environments, the setting of the study is identical to the "everyday reality" or mundane reality in which most subjects live their lives. High mundane reality makes it easier to generalize to people's typical settings and it facilitates external validity. However, laboratory experiments in particular may use unusual settings or tasks. While these settings or tasks may be engrossing or compelling, thus high in experimental reality, they do not resemble the settings to which researchers may really want to generalize.

Our experiment can be looked at, in its most basic sense, as basic science, in that we learned the effects of social network on stress responses for the sake of learning and not to solve a societal issue. However, if participants did not pay attention to the treatment or comprehends its message, it will appear that we had no

effects at all, whereas if we had simply used a stronger manipulation, our predictions would have been confirmed. Therefore, since we were doing experimental work, we needed to have a stronger manipulation check, an inclusion to measure if subjects even paid attention to factors in the treatment and understood its message.

For future research, we could use more deception on the experimenter end by avoiding collecting our own data i.e. not acting as our own experimenter or interviewer, by trading off with another student or applying for a small university or external grant to hire someone. With more deception, we may prevent reactivity and bias into our study. In conclusion, our findings indicate that a sense of belonging is a powerful indicator of health and well-being. Supporting past research, our pattern seems to show that a lack of social network may result in increased cardiovascular stress responses, that it is the closeness or quality as opposed to quantity of relationships with others that matters in protecting oneself from stress and that this protection is facilitated by increasing diversity of a social network.

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**Table 1**

*Mean Scores and Standard Deviations for Heart Rate Measure by Social Network and Stress Manipulation*

	High		Low		
	M	SD	M	SD	
High	82.02	(10.10)	87.89	(10.95)	84.96
Low	84.18	(9.39)	77.64	(10.37)	80.91
	83.10		82.77		

Note: Heart rate measure in Beats per Minute (BPM). Standard deviations in parentheses.

**Table 2**

*Mean Scores and Standard Deviations for Difficulty of Word Search by Social Network and Stress Manipulation*

Social Network Strength	High		Low		
	M	SD	M	SD	
High	2.86	(0.69)	2.60	(0.70)	2.73
Low	2.00	(0.50)	2.33	(0.52)	2.17
	2.43		2.47		

*Note:* Mean scores based on a rating scale from 1 to 5, 1 indicating "Very difficult" and 5 indicating "Very easy." Standard deviations in parentheses.



**Table 3**

*Mean Scores and Standard Deviations for How Well Performed by Social Network Strength and Stress Manipulation*

Social Network Strength	High		Low		
	M	SD	M	SD	
High	4.29	(0.76)	3.90	(0.57)	4.10
Low	4.22	(0.67)	3.67	(0.52)	3.95
	4.26		3.79		

*Note:* Mean scores based on a rating scale from 1 to 5, 1 indicating “Excellent” and 5 indicating “Poor.” Standard deviations in parentheses.