

# Effect of social support on heart rate during stressful task



## Abstract

Stress is always unpleasant, along with the reaction a has when faced with a threat that we feel we do not have the means to deal with. Stress can make breathing quicken, the heart pound and muscles to tense. This is well-known through past research that lack of social support contributes to a higher level of mortality and morbidity. In the past, researchers have found direct relationships between a levels of social support and heart rate. The aim of this study was to discover whether there was a direct link with levels of high social support and heart rate when a person is experiencing levels of stress. Participants completed six tests, including Duke-UNC Functional Social Support Questionnaire and the emotional stroop test. A 2×2 mixed factorial design Anova test was carried out to analyse the data retrieved from these tests. Results showed that lower social support had lower heart rate readings during stressful situations, therefore does not support the predicted hypothesis.

## Introduction

Stress, according to the Oxford dictionary, is ‘ a state of mental or emotional strain or tension resulting from adverse or demanding circumstances’. it is a reaction a person experiences when faced with a threat that we feel we do not have the means to deal with.

Stress is always unpleasant – even when it is perceived to be transient, it can trigger stress hormones that produce physiological changes. Stress can make breathing quicken, the heart pound and muscles to tense. The reaction to stress is known as the ‘ fight or flight’ response, evolving as a survival

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mechanism, allowing quick reactions to often life threatening situations. The stress response begins in the brain, when a danger or perceived stressor appears in the eyes or ears send the required information to the amygdala, where emotional processing occurs. The amygdala interprets information and sends a signal of distress to the hypothalamus. The hypothalamus, or control centre, then communicates with the rest of the body via the autonomic nervous system, controlling the involuntary functions such as heart beat and blood pressure. Once the amygdala has sent the distress signal, the hypothalamus then activates the sympathetic nervous system, sending signals to the adrenal glands via the autonomic nerves. The response of the adrenal glands is to pump adrenaline into the blood stream. As the adrenaline travels around the body it brings on some physiological changes. As the initial surge of adrenaline begins to subside, the hypothalamus activates the HPA axis; the 2nd component of the stress response.

The HPA axis is dependent on the hormonal signals in order to keep the sympathetic nervous system pressed down. If a danger continues to be perceived it causes the hypothalamus to release CRH. The CRH then travels up to the pituitary glands which in turn triggers the release of ACTH. ACTH travels to the adrenal glands – causing them to release cortisol. This then enables the body to remain on high alert. When the perceived threat or stressor has passed, the cortisol levels fall and the parasympathetic nervous system dampens the stress response.

Stress is normal, yet an unavoidable part of life. Too much stress on a person can have an effect on emotional and physical well-being. In the 2015 stress <https://assignbuster.com/effect-of-social-support-on-heart-rate-during-stressful-task/>

survey ' the average stress levels today are slightly higher than they were in 2014'. Lazarus (1999) considered individuals coping mechanisms to stress. Lazarus claimed /there can be complications in trying to calculate performance on stressful tasks as some people perform better under stressful situations and others don't'. Stress is often reacted to differently, dependent on their assessment of the situation.

Social support has a clearly defined link to physiological health including mortality. Individuals with low social support are at a higher risk of death, whereas individuals with higher social support have an increased level of survival (Holt-Lunstad et al, 2010). Social support is often a perception that a person is cared for and has the aid from other people whilst being a part of supportive social network, this can be in the form of informational, emotional, tangible, intangible or basic companionship. Social support comes from various sources such as; family, friends, organisation etc.

The broad subject of social support is studied amongst many disciplines including psychology, public health and social work. It is often linked to many benefits for both mental and physical health. The two models which link social support and health are the buffering hypothesis and the direct effect hypothesis (Cassell & Cobb, 1976). The buffering hypothesis suggests that social support is only beneficial whilst experiencing stress, whilst the direct effect hypothesis gives predictions that it is beneficial to have social support at all times, evidence has been found that lends support to both hypothesis (Taylor, 2011). Cobb primarily focused on the ' stress buffering effect' of social support and placed greater emphasis on the informational value of social support. In addition, Cassell, similarly viewed any social relationship as <https://assignbuster.com/effect-of-social-support-on-heart-rate-during-stressful-task/>

a potential buffer from life stressors but a higher level of emphasis on the importance of physiological processes in mediating the effects of social relationships. Further suggestions by Cassell (1976) were the direct associations between physical health and social support. House (1981) also claimed that social support is often associated with greater psychological well-being within a workplace.

Stress has many factors which can have both a negative and a positive effect, this experiment looks at how social support can aid in stress response. The research by Eisenberger et al (2007) investigated how the neural correlates, causing the stress protective effects of social support by looking at the neural activity when a social stressor is in play, relating this to social support and the cortical responses to it. It showed that those claiming to have high levels of interaction with supportive individuals showed less dorsal anterior cingulate cortex and Brodmann's area 8 activity whilst participating in a social rejection task. The findings suggest that reduced stress reactivity due to social support; ultimately providing clear evidence that social support may be of benefit to health (Eisenberger et al, 2007).

We set out to investigate whether those with higher social support were shown to have a lower heart rate reading. For this experiment the measures were creativity and whether or not there was a presence of an imaginary friend in childhood. The hypothesis predicts the findings will show that high social support will aid in stressful situations and therefore show a lower heart rate reading.

## Method

### Materials

Test was completed in laboratory conditions. The participants were broken down into smaller groups of 5 participants. Each group had an Omron Blood Pressure Monitor, a table to record the found results (Appendix ). The groups had a list of instructions to be followed which were read out by one specific member of the group. Within the booklet were Emotional Stroop Test (Appendix ), Anagram Task (Appendix ), a -questionnaire (Appendix ) – consisting of the DUKE-UNC Functional Social Support Questionnaire, The Big 5 Inventory (Neuroticism only) and COPE (Active coping scale).

### Participants

There were a total of 90 undergraduate students who were selected to participate in this test. The participants were students at the University of Bolton therefore making it an opportunity sample. The age range between the participants was 18-53 years old and the mean age of the participants was 24.08.

### Design

This study used within groups; 2 x 2 mixed factorial design. The independent variable (IV) was the tasks given. The dependant variable (DV) was the heart rate reading; average and resting.

### Procedure

Participants were within a laboratory setting. They were instructed to complete the booklet in order as it appeared. There were small groups of 5, <https://assignbuster.com/effect-of-social-support-on-heart-rate-during-stressful-task/>

with one reading the instructions out loud, one completing the task and having their heart rate measured and another recording the results. The reader should then read out briefing instructions as follows:

*We will attach you to the OMRON Blood Pressure Monitor to measure your pulse rate and give you a few cognitive tasks. This will cause you no discomfort; the blood pressure cuff will be placed on your upper arm. The cuff will inflate and measure your blood pressure and pulse rate. You are able to withdraw at any point of the study but will be unable to withdraw at the end as you will not be identified in your data (only your age, weight, height and BMI are recorded). Are you happy to continue? Do you have any questions?*

The height, age and weight of the participant were initially recorded onto the table (Appendix A). The participant then placed the pulse rate monitor into the correct position on their arm and the reading was taken and recorded. The reader then read the task instructions for the imagery test (Appendix B) followed by a five minute relaxation period – the pulse rate reading was then taken and recorded. The reader then read aloud the instructions for the emotional stroop test (Appendix C), after the participant completed the task, the pulse rate was measured and recorded. Immediately following this task, the reader read instructions for the anagram task (Appendix D). The participant proceeded with the task, they were told that if the task hadn't been completed within 5 minutes they were to stop and the reading of pulse rate taken and recorded. All results from each individual group were collected and input into SPSS for analysing.

Results

The raw data is the overall scores achieved from the lab experiment.

Descriptive Results


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High Social Support    Low Social Support

Mean SD N    Mean SD N

Pulse Rate

Resting 87.13.15    20 77.64.13.69    11

Pulse Rate

Average Task 86.73.13.07    20 81.05.13.50    11

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The table shows the descriptive statistic results from the lab experiment stating the mean and the standard deviation from SPSS data.

Inferential Results

An investigation to look at whether high social support will aid in stressful situations and therefore show a lower heart rate reading. The results for high social support show for resting pulse rate;  $M = 87$ ,  $SD = 13.15$  and for average task;  $M = 86.73$ ,  $SD = 13.07$ . The results for low social support show a resting pulse rate of  $M = 77.64$ ,  $SD = 13.69$ , and for an average task  $M = 81.05$ ,  $SD = 13.50$ . Participants with lower social support showed lower

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heart rate readings (resting;  $M= 77.64$ ,  $SD= 13.69$  average;  $M= 81.05$ ,  $SD= 13.50$ ) compared to those with higher social support (resting;  $M= 87$ ,  $SD= 13.15$ , average;  $M= 86.73$ ,  $SD= 13.07$ ).

### Discussion

The purpose of this study was to investigate in more depth whether having a high social support will aid in stressful situations and therefore show a lower heart rate reading. The predicted hypothesis was that high social support will aid in stressful situations and therefore show a lower heart rate reading.

The results do not support the hypothesis that high social support will aid in stressful situations and therefore show a lower heart rate reading, with both the resting rate and average rate being lower with low social support.

The research is not consistent with past research by Einsenburger et al (2007) and does not prove that those with higher social support give lower heart rate readings during stressful situations. The links reported in this study have a clear representation of the research question asked since it was confirmed to have the same outcome as previous experiments.

Some problems identified with this study were that there were no indications of culture, indications of their home life situations, or geographically where they were brought up. In any future research a qualitative research study could be considered to allow a greater understanding of the deeper underlying influences.

If we were looking for ways to improve this study, we could look at a greater sample size which allow for greater array of results, allowing for any possible

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outliers etc. We must also account for the fact that the results may not be 100% accurate; some participants may have not been truthful when completing the questionnaires; possibly through embarrassment when around peers, therefore giving false answers. Participants may also have anxiety and depression which may cause heightened stresses.

Overall, this study was meant to follow the findings of Eisenburger (2007) in order to enable us to broaden the understanding of social support and the effect it has on heart rate during stressful tasks. The same outcomes were not found therefore it cannot be strengthened and further understanding of stress reductions and its effects on the body cannot be found.

### Appendices

#### Appendix A

#### Results Table

| Age | Height | Weight | HR resting | HR Stroop | HR anagram | HR average | Social Support Score | Neuroticism score | Active coping score |
|-----|--------|--------|------------|-----------|------------|------------|----------------------|-------------------|---------------------|
|     |        |        |            |           |            |            |                      |                   |                     |

#### Appendix B

#### Imagery Instructions

“ I would like you to use your imagination to help you relax. Begin by imagining being in a very pleasant and happy mood. Imagine that you are

doing something you really like, such as lying on a warm, sandy beach, with the sound of the waves in the distance. Imagine what you can see and what you can feel. You can close your eyes if you wish. Breathe in deeply and then breathe out slowly, relaxing your muscles. You should feel peaceful and relaxed. Just let go, and enjoy the calm, relaxed feeling.”

## Appendix C

### Emotional Stroop Task

|           |           |            |           |
|-----------|-----------|------------|-----------|
| Failure   | worthless | Ugly       | inferior  |
|           | ss        |            |           |
| Stupid    | failure   | sniggered  | worthless |
|           |           | d          | s         |
| Ugly      | stupid    | derided    | inferior  |
| Inferior  | ugly      | mocked     | worthless |
|           |           |            | s         |
| worthless | inferior  | sniggered  | defeated  |
| s         |           | d          |           |
| defeated  | derided   | derided    | ridiculed |
| ridiculed | mocked    | mocked     | sniggered |
|           |           |            | d         |
| sniggered | criticize | criticized | derided   |

d d

derided inferior humiliat criticized  
ed

mocked worthle humiliat  
ss inferior d

criticized defeate worthles insulted  
d s

humiliat ridicule  
ed d defeated ugly

insulted snigger ridiculed inferior  
ed

ugly derided sniggere worthles  
d s

inferior derided derided defeated

worthles worthle inferior inferior  
s ss

defeated insulted Ugly worthles  
s

ridiculed derided derided defeated



## Questionnaire

Duke-UNC Functional Social Support Questionnaire (FSSQ) Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please read each statement carefully and place an ' X' in the column that is closest to your situation. Give only 1 answer per row.

| 1                       | 2          | 3         | 4      | 5          |
|-------------------------|------------|-----------|--------|------------|
|                         | Almost as  | Some,     | Less   | Much less  |
| As much as I would like | much as I  | but would | than I | than I     |
|                         | would like | like more | would  | would like |
|                         |            |           | like   |            |

I have people who care  
what happens to me.

I get love and affection.

I get chances to talk to  
someone about  
problems at work or  
with my housework.

I get chances to talk to  
someone I trust about  
my personal or family

problems.

I get chances to talk  
about money matters.

I get invitations to go  
out and do things with  
other people.

I get useful advice about  
important things in life.

I get help when I am  
sick in bed.

### Scoring

Responses to each question are scored on a 1 to 5 scale. “ As much as I would like” receives a score of 5 and “ Much less than I would like” receives a score of 1. The scores from all eight questions are summed (maximum 40) and then divided by 8 to get an average score. The higher the average score, the greater the perceived social support.

Social Support Score \_\_\_\_\_

(15)

The Big Five Inventory (BFI) (Neuroticism scale only) Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a  
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number next to each statement to indicate the extent to which you agree or disagree with that statement.

|                   |                   |                            |                |                |
|-------------------|-------------------|----------------------------|----------------|----------------|
| 1                 | 2                 | 3                          | 4              | 5              |
| Disagree strongly | Disagree a little | Neither agree nor disagree | Agree a little | Agree Strongly |

I see Myself as Someone Who...

\_\_\_ 4. Is depressed, blue

\_\_\_ 9. Is relaxed, handles stress well

\_\_\_ 14. Can be tense

\_\_\_ 19. Worries a lot

\_\_\_ 24. Is emotionally stable, not easily upset

\_\_\_ 29. Can be moody

\_\_\_ 34. Remains calm in tense situations

\_\_\_ 39. Gets nervous easily

### Scoring

Reverse (i. e. 1= 5, 2= 4, 3= 3, 4= 2, 5= 1) scores for question 9, 24, and

34. Add up all scores.

Neuroticism score \_\_\_\_\_



(16)

COPE (Active coping scale only)

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Then respond to each of the following items by blackening one number on your answer sheet for each, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no “right” or “wrong” answers, so choose the most accurate answer for YOU-not what you think “most people” would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1 = I usually don't do this at all

2 = I usually do this a little bit

3 = I usually do this a medium amount

4 = I usually do this a lot

\_\_\_ 5. I concentrate my efforts on doing something about it.

\_\_\_25. I take additional action to try to get rid of the problem.

\_\_\_\_47. I take direct action to get around the problem.

\_\_\_\_58. I do what has to be done, one step at a time.

### Scoring

Total the scores for each of the items.

Active coping score \_\_\_\_\_

(17)

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