Relationship between Stress Response and Stress Tolerance Characteristics for Midwife Students
助産師学生のストレス反応とストレス耐性特性との関係

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Abstract

Generally, students who try to get the license of midwives to take lectures and practices and pass the exams before clinical practices. They have to study and learn a lot of things in a short time. Additionally, they need to pass to the next grade. Therefore, many students feels stressed too much to get sick both physically and mentally. We can use Saliva cortisol to measure stress. There are a few pieces of research that show the specific characteristic of stress reaction while there are many pieces of researches that related to the in-day fluctuation of stress and saliva cortisol. Therefore, we would like to research that related to the connection between stress tolerance and stress reaction.

17 healthy female students who want to be midwives participated in this examination. We measured their specific characteristic of stress tolerance, and then measure their feeling and saliva sputum before and after exams, which affects stress. Before this research, we also researched students' specific characteristic of stress tolerance and stress action physically and physiologically with hardiness. Then, we researched their feeling two weeks before, during exam week, and after exam week with Visual Analogue Scale (VAS). We did it at 8 am, at 12 pm, and 8 pm each time.

A control sense was low like a melancholy persons in the morning by the situation that they have no stresses as a test, and a challenge was low like persons afraid of 1 day before of the test at night the previous day. The melancholy person irritated in a morning of the test previous day found out that a control sense is low. Circadian variation of the individually different saliva cortisol density was judged by daily life of a target. On the other hand, correlation was not admitted the saliva cortisol density by stress reaction and stress tolerance.

It is helpful and important to find your special characteristic of stress tolerance, the way to manage stress in case necessary. While specific characteristic of stress tolerance is depending on each person, it affects the stress response physically and physiologically. This research will be helpful for students who feel stressful earlier as need, and it also will be the clue to find their way of stress management as a midwife and nurse.

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key words: (Stress reaction) (Stress tolerance) (Saliva cortisol)

Ⅰ. Introduction

Generally, students who try to get the license of midwives to take lectures and practices and pass the exams before clinical practices. They have to study and learn a lot of things in a short time. Additionally, they need to pass to the next grade. Therefore, many students feels stressed too much to get sick both physically and mentally. Then we think it is necessary to assess the abilities to stress management of each person objectively and lecture students with a proper way to manage their stress. Since she feels stressed if she is a midwife, she need to manage hers stress and health. It is not only for hers school life but for hers job as a midwife as well.

We can use Saliva cortisol to measure stress. It is one of the steroid hormones. The amount is depending on stress (Shimomura and Kanamori, 2010, p.247-254). The highest concentration of cortisol is the time people just wake up. It is getting lower afternoon (Watanabe, 1991, p.28-36). Cortisol concentration is related to blood concentration. Therefore, it is possible to measure the function of the adrenal cortex without blood collection (Ishida and Honma, 2008, p.2-9). In addition, recent research shows that proteins in saliva such as antimicrobial peptides and cytokines also show stress and the function of the autonomic nervous system (Usui, 2011, p.2005-14). There are a few pieces of research that show the specific characteristic of stress reaction while there are many pieces of researches that related to the in-day fluctuation of stress and saliva cortisol. Therefore, we would like to research that related to the connection between stress tolerance and stress reaction.

Ⅱ. Method

1. Subject

17 healthy female students who want to be midwives participated in this examination. The average age was 21.

This research is based on the Helsinki Declaration, and it is also admitted by the ethnic committee at Hakuho college (authorization number: 16005).

We explained this experiment with documents admitted by the ethnic committee to all participants. They all agreed with our experiment. Since menstruation affects Saliva cortisol, we asked participations about it. We did not include people who 1) having medical conditions which affect hormones 2) taking any medications 3) smoking 4) pregnant or nursing person 5) menstruation during this experiment 6) having injuries in the mouth.

2. Research

First of all, we measured their specific characteristic of stress tolerance, and then measure their feeling and saliva sputum before and after exams, which affects stress. We also investigated attendance and their health conditions. Before this research, we also researched students' specific characteristic of stress tolerance and stress action physically and physiologically with hardiness. Then, we researched their feeling two weeks before and after exam week and during exam week with Visual Analogue Scale (VAS). We did it at 8 am, at 12 pm, and 8 pm each time. We did both saliva sputum collection and VAS nine times. We define two weeks before

the exam as Day 1, during the exam as Day 2, and two weeks after the exam as Day 3 (figure 1). We did VAS in a minute and investigate the in-day fluctuation of Saliva cortisol and protein in Saliva. We got data together out of classes.

3. Investigation with questions about hardiness

The hardiness is the personality characteristic the people have in order to maintain their health under the high stress or pressure (Kobasa, 1979, p.215-229). The made 15 items were used in the scale measure of hardiness (Tada and Hamano, 2003, p.56-62). I asked people to answer the 15 items in the following manner
1 not applicable 2 slightly applicable 3 not say either 4 slightly applicable 5 very applicable.
Subjects responded from these 5 items.

Getting high score in the questionnaire indicates the high hardiness.

The question item consists of 3 items. A commitment (the tendency I make myself concerned with a matter, and in which it's immersed), A challenge (the tendency from which the environment can change with a grown-up chance), and A control sense (the tendency which believes that a confidence can have an influence on the situation which changed) can be named as the personality characteristic which can stand up to a stress.

Subjective emotion questionnaire consists of the 19 items. In this questionnaire, people add a cross for each question based on their current emotion on a 10 centimeter-long line from the minimum 0, which means they do not feel anything, to the maximum 10, which indicates their strong feeling. The questions are 1 tense, 2 worried, 3 stresses, 4 refreshing, 5 depressed, 6 flustered, 7 anger, 8 afraid, 9 coolness, 10 lonely, 11 relieved, 12 excited, 13 shut myself, 14 empty, 15 rebellious, 16 exhausted, 17 bored, 18 feeling is good, 19 sad.

4. Saliva extraction method

An extraction container of saliva used Saliva cotton of ZARUSUTATTO COMPANY, and it is scoured off.

A subject is oneself and has a container of Saliva cotton. And the sterilization absorber in the container (cotton), the hand, without touching. It was put in the mouth and a mouth was moved for 30 seconds. After cotton included saliva sufficiently, the subjective person themselves doesn't use a hand for a container more than a mouth, and cotton is taken out (Shiraishi, 2009, p.793-798).

3 days when we designated this operation, it was put into effect. This is 3 times a day (8:00, 12:00, and 20:00) into effect. Both were put into effect before water and the food intake as an attention point of extraction. Absorption of the drink and the food by which caffeine is included was put aside from 2 hours before of extraction in particular and tooth brushing was also cut down. Alcohol absorption was cut down from before 24hours. A subject picked after it was rinsed for water in 10 minutes ago of extraction in the mouth (Clements, A.D. and Parker, C.R, 1998, p.613-616). We paid attention to the temperature and management practice with a procedure, and by which handled a sample after extraction.

5. Cortisol measurement in the saliva

Extracted saliva was returned to the room temperature and centrifuge separation for 2 minutes was

performed by 2000xg. On the centrifugal back was sampled. An analysis of the saliva cortisol density put 5 people into effect. We analyzed by enzyme-linked immunosorbent assay; ELISA. Measurement article uses sensitive saliva cortisol EIA measurement kit Expand Range High Sensitivity Salivary CORTISOL ENZYME IMMUNOASSAY KIT (SALIMETRICS USA), saliva cortisol, we colored. We gauged a coloring substance with wavelength 450nm using light absorption total of BIO RED and determined the quantity.

6. Dialysis analysis method

After sharing a subject with a high score crowd and the low score crowd by a linear measure score of hardiness, subjective feeling and a change in saliva ingredient amount were analyzed by 2 factors of variance analysis. A linear measure score of hardiness, subjective feeling and saliva ingredient amount checked the percentage of attendance, physical condition and the influence which gives it to the test result using a regression analysis. All obtained data was indicated by a mean and a standard deviation, and the significant level was less than 5 % in all official approval.

Ⅲ. Result

1. The density of saliva cortisol

A high price was gauged by the saliva cortisol density with 5 measurement persons at 8:00, and they became short at 20:00 from 12:00. Whole 5 of 5 subjects could see circadian variation together. The numerical value of each 2 weeks before of a test, the previous day of a test, and 2 weeks later, 2.352 ± 2.1 μg/dl, 3.5 ± 2.0 μg/dl, and 2.524 ± 1.2 μg/dl. Significant variation per day was not judged by 3 days. But it was thought that the test day is expensive a little. Correlation was not seen between the score of a test and the density of saliva cortisol.

2. Analysis of the hardiness measure and VAS

The average score of the hardiness linear measure was a commitment, 3.6 (2.4-5.0), a challenge, 4.2 (2.4-5.0), and a control sense are 3.6 (1.4-4.8).

Of the control and the VAS score which are hardiness in a morning of Day1, "gloomy" "depressed" then negative correlation was admitted. (r=-0.603 P=0.010 Figure 2).

They were a challenge and the VAS score of hardiness in night of Day2 "afraid" then negative correlation was admitted. (r=-0.488 P=0.047 figure 3).

Of the control sense and the VAS score which are hardiness in a morning of Day3, "anger" then negative correlation was admitted. (r=-0.496 P=0.043 figure 4).

They were a control sense of hardiness and the VAS score in a morning of Day1 and a morning of Day3 "gloomy" then negative correlation was admitted respectively. (Day1, r=-0.472 P=0.056: Day3 and r=-0.595 P=0.012 Figure 5).

3. Analysis of saliva cortisol and VAS

The relationship between VAS score (afraid) at Day 2 night Person who studied saliva cortisol and hardiness

(challenge) shown in figure 6. (r=-0.488 P=0.047 figure 6).

The relationship between VAS score (anger) at Day 3 morning Person who studied saliva cortisol and hardiness (control) shown in figure 7. (r=-0.496 P=0.043 Figure 7).

The relationship between VAS score (gloomy) at Day 3 morning Person who studied Saliva cortisol and hardiness (control) show in figure 8. (r=-0.595 P=0.012 figure 8).

Ⅳ. Discussion

It is being talked about that a stress has an influence on an autonomic nervous activity, endocrine system and the immune system and has a various influence on the homeostasis of the living body. Representative biological reactions by adding a lot of stress, hypothal-amus-pituitary-adrenale; HP system and sympatho-adrenale-medullary; SAM system which cortisol and catecholamine (Takatsuji and Sugimoto, 2008, p.89-92). As a result, a rise of the blood pressure, the heart rate and a blood glucose level. It was compared by the situation that a considerable stress hangs from the situation that a stress begins to hang and the situation that we reduce in 3 points the previous day by this research. It was suggested that vanity and control feeling tend to be a short person in the morning depressingly by the situation that a stress as a test is little as a result of figure 2. In other words, the thing by which a control sense has like a melancholy person in the morning was suggested.

It was suggested that the person having a low challenge characteristics is nervous about the night feeling of the examination day before from a result of figure 3. It was suggested that the person who had low tendency that could regard a change as growth felt scared at the time to greatly take stress. It can be said that vanity and control feeling tend to be irritated with a short person as a result of figure 4. In other words, the thing with the low tendency which believes that one could have an influence on the situation that the person irritated with feeling in the morning just before the test changed was suggested.

In a recent study, Hirose and Kato (2009, p.807-811) said the doctor's stress value to the anesthetic business, and the result doctors suggests the case that a stress is also added to the weather which has no work on a day with schedule work and also the fact before beginning to work, in which a potential mental stress to future work exists.

In this experiment, cortisol was higher if we did on the exam day as well. Therefore, it is possible to say you way feel more stressful when you think you have to pass the exams. The research of salivary cortisol among healthy people shows that the highest data was in the morning while the lowest one was at night. In a recent study, Mika, K (2013) found that people whose amount of Salivary cortisol is around the same in all day may have twice higher risk due to heart disease than others. In addition, they feel more stressful than others. In our research, we can say stress reaction of all participants worked precisely since their data of salivary cortisol was depending on time. It is also possible to say they can handle their stress and it is not too much for them, and they did not have risks of disease due to stress.

We think it is easier to manage your stress when you take important exams for your future if you know your special characteristic of stress tolerance. By understanding your characteristic, you can avoid getting too

much stress. For example, it is significant to see yourself objectively to analyze and find your best way to handle your stress. If professors can know about characteristics of stress tolerance of each student's from physical characteristics, grades, and readiness, they may be able to support their students well. Students themselves should tell their situations they face to their families, friends, professors, or any other people they can trust. In my opinion, it leads students to handle their stress much easier. On the other hand, students should be able to manage their stress by themselves as people who get involved in medical science in the future. Professors often keep eye on students and not do anything special for their students, which is necessary for students. One piece of research shows that you can use Cognitive Behavioral Therapy (CBT) for your stress management. CBT is the way to score your happiness, activeness, and other good feelings by making lists of your actions to see yourself objectively. As I showed it above, it is helpful and important to find your special characteristic of stress tolerance, the way to manage stress in case necessary.

This experiment, however, there are some limitations. First of all, it is said just among women since all participants were women. Additionally, there were a few samples of saliva sputum as our criteria of participation were depending on their menstrual cycle. We should take samples more to make this experiment more accurately. Generally speaking, not just exams make people feel stressed as well. We would like to research with not only stress but other objects. We also would like to use chromogranin A (Cga A) and amylase α (sAA) to research the connection between stress action and specific characteristic of stress tolerance in the clinical training of midwife. By doing so, we will be able to think of the way to teach the way of stress management to students who are stressed out well. That will help the future of students as midwife.

Ⅴ. Conclusion

While specific characteristic of stress tolerance is depending on each person, it affects the stress response physically and physiologically. This research will be helpful for students who feel stressful earlier as need, and it also will be the clue to find their way of stress management as a nurse.

Acknowledgments

Thank you for everyone who helped us with this research.

In addition, the author wish to thank Arkansas State University Physical education of Dr. Naoko Yoshimura for her help in taking part of the translation.

Conflict of interest

There is no conflict of interest in this research.

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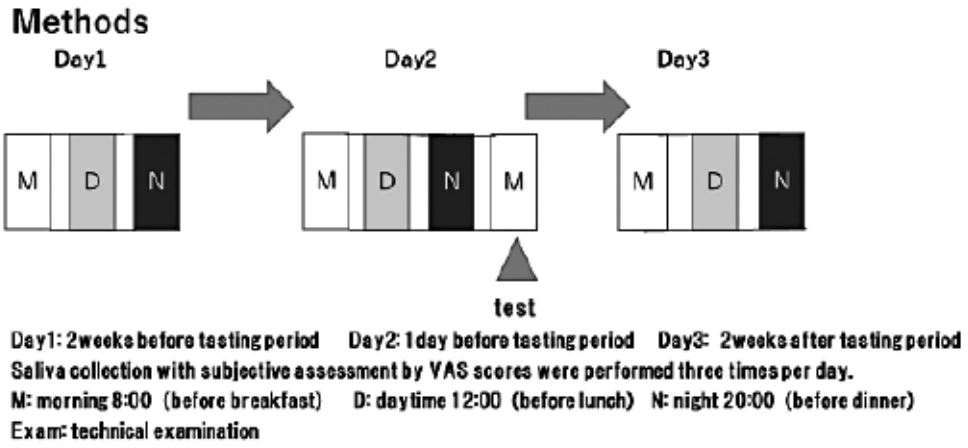

Figure 1

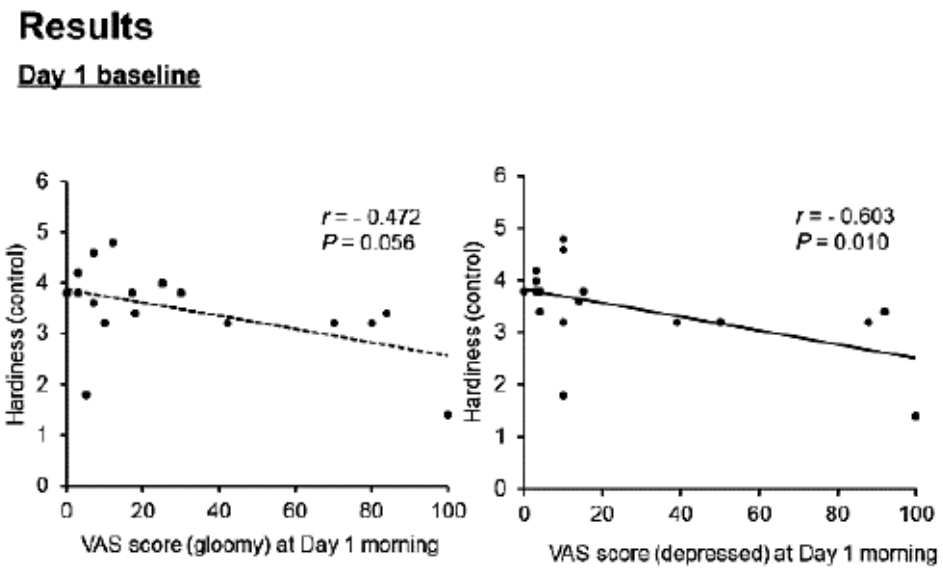

Figure 2

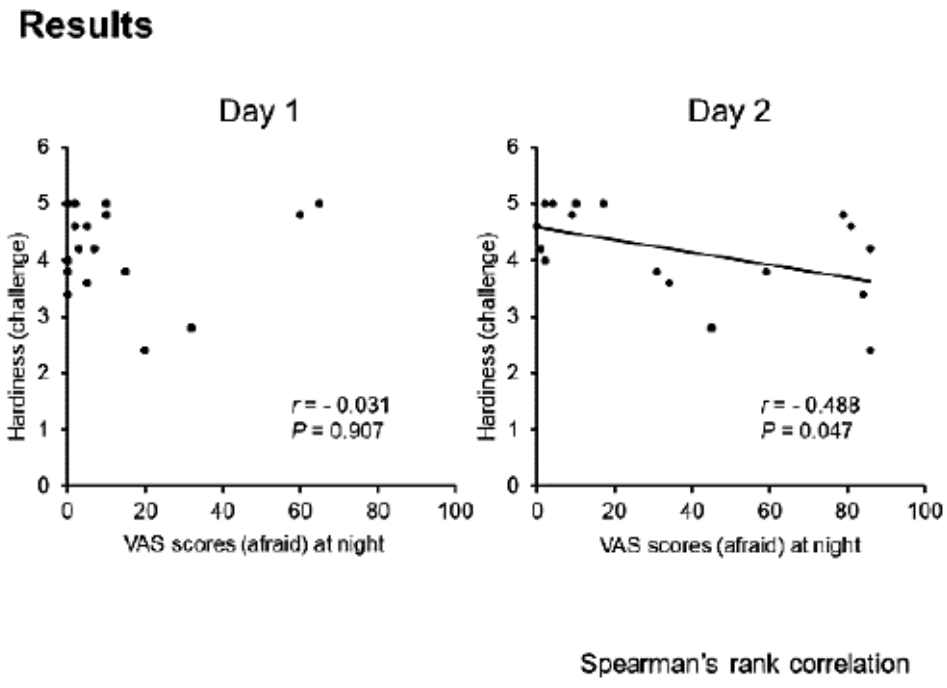

Figure 3

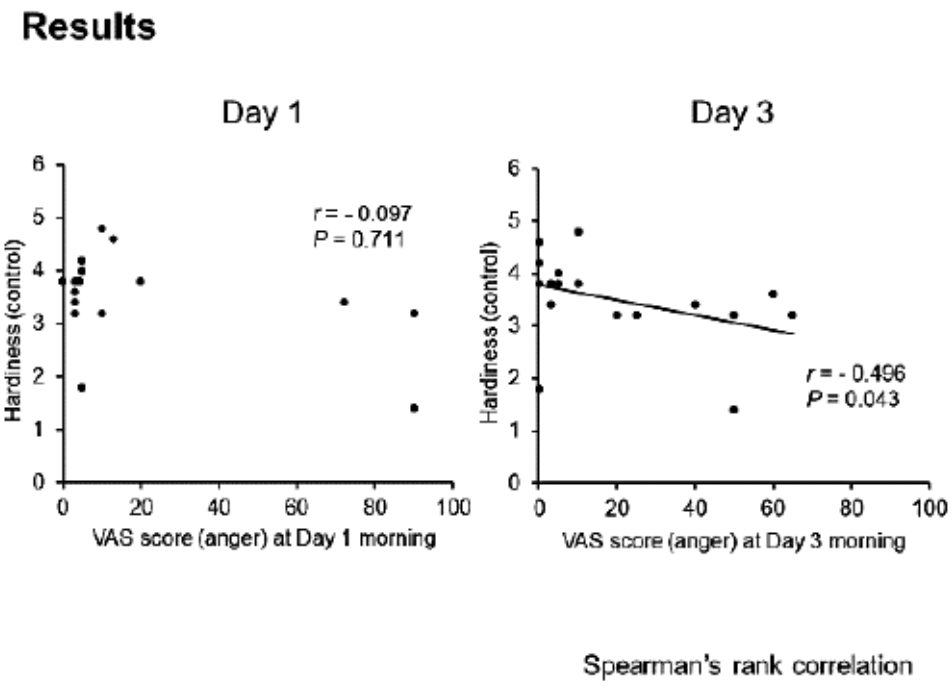

Figure 4

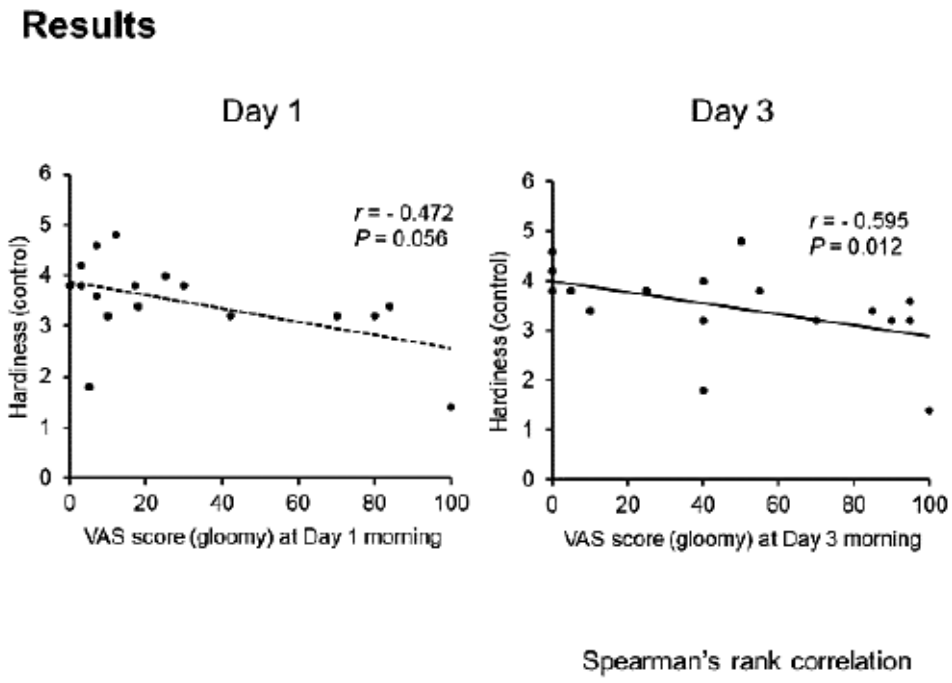

Figure 5

Saliva cortisol measurement (n=5)

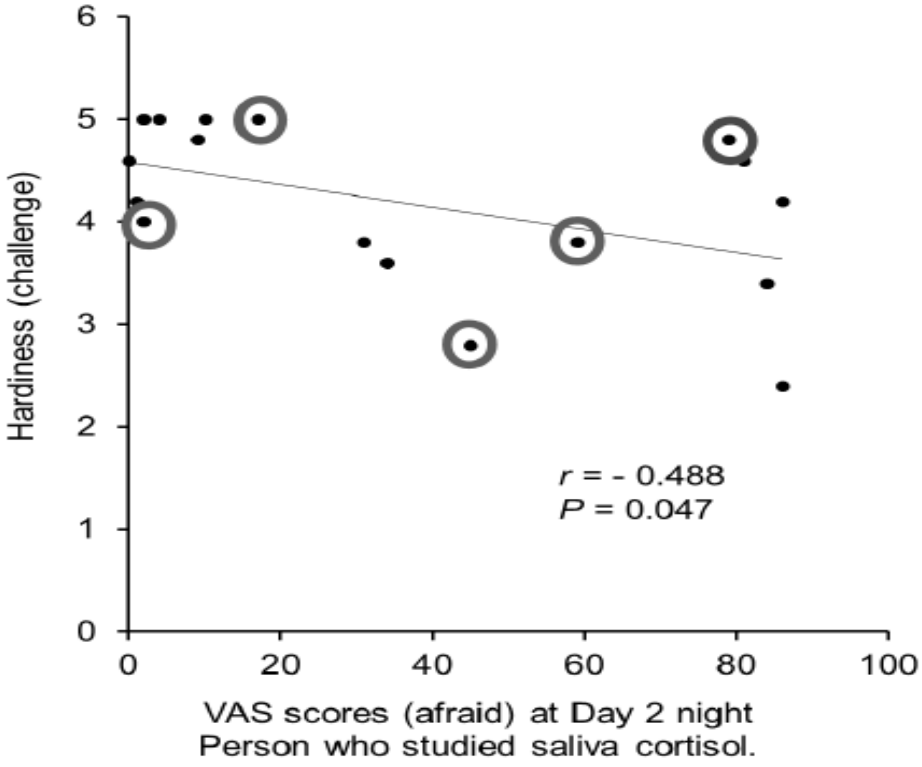

Figure 6

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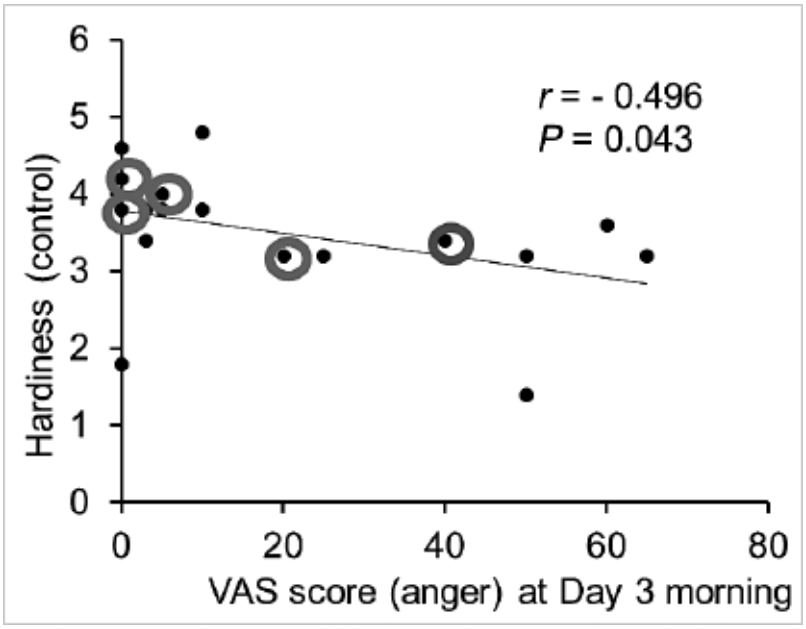

Figure 7

Saliva cortisol measurement (n=5)

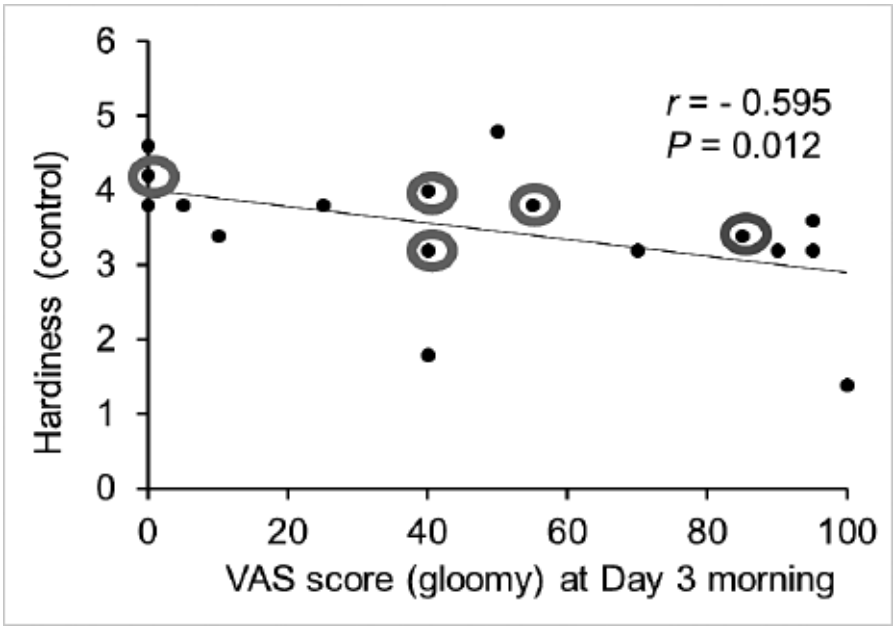

Figure 8