

## Correlation Between Skin Galvanic Response with Snake Photographs, Self-Assessment of Fear, and the Level of Natural Snake Fear

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### Abstract

We report on the correlation of three parameters such as: the scores in Snake fear questionnaire, the amplitude of Galvanic skin response (GSR) and subjective evaluation of fear. 76 subjects of both sexes in total, mean age 26 fulfilled the Snake anxiety questionnaire (SNAQ) to calculate the snake fear scores.

**Inclusion criteria:** The range of scores between 19-21 pointing to the higher level of snake fear. Experimental paradigm included exposition of study participants to snake photographs (SP) with parallel registration of galvanic skin response. Snake photographs, 20 in total, were exposed one by one on computer screen. Participants were requested to evaluate the stimuli as either neutral or scary and put grades using scale 0-5: not scary at all - 0 and 5 - very scary. Android application program was used for the registration of galvanic skin response. SP were evaluated as not scary and mean score in SNAQ was 19.8 in 32.9% of participants. SP were evaluated as moderately scary and mean score in SNAQ was 20.03 in 40.8% of participants, and SP evaluation as very scary and mean score in SNAQ 19.9 was registered in 26.3% of participants. Higher amplitudes of GSR were registered in case, when SP were evaluated as very scary and grading was 4-5. Lower amplitudes of GSR were registered in case when stimuli were evaluated as either not scary, or moderately scary. No correlation of scores in SNAQ with self-reported evaluation of fear was found. Amplitudes of GSR (higher vs lower) did not correlate with scores in SNAQ as well. Higher/lower amplitudes of GSR correlated with evaluation of SP as very scary/not scary.

**Conclusion:** 1. The lower amplitudes of GSR are in correlation with subjective evaluation of SP as either not scary or moderately scary; 2. Higher amplitudes of galvanic skin response are in correlation with subjective evaluation of SP as very scary 3. High scores in SNAQ do not correlate neither with the amplitude (higher/lower) of GSR nor with the self-reports (not scary/scary) of fear.

**Keywords:** Skin Galvanic Response; Questionnaire; Self Report; Snake Fear

### Abbreviations

SGR: Skin Galvanic Response; SNAQ: Snake Anxiety Questionnaire; SP: Snake Photographs

### Introduction

Galvanic skin response (GSR) is used as a measure of reaction to emotional stimuli [1]. Subjects, having a fear of snakes develop

high amplitude GSR when exposed to snake photographs -SP [2]. Reaction to snake photographs is measured by subjective verbal evaluation of fear as well [3]. At the same time, the level of snake fear is evaluated by Snake anxiety questionnaire (SNAQ). Scores higher than 22 (out of total of 30) are considered pointing to snake phobia, while lower scores express the level of snake fear, natural to most of people [4]. However, it is not clear whether GSR, subjective evaluation of fear and SNAQ scores correlate with each other.

## Materials and Methods

Total of 76 subjects of both sexes, mean age 26, were recruited in the study. All participants signed the written consent of participation in the experiment. They were instructed, that experiment is related to animal fear. Participants were requested to fulfill the SNAQ. Inclusion criterion: the range of scores between 19-22, pointing to the higher level of snake fear. During experimental procedure, participants were seated in front of the computer screen. Total of 20 SP, were exposed on computer screen. one by one, for 2 s, with 10 s pause between stimuli. In the pause, participants were requested to evaluate the fear by scale 0-5: not scary at all - 0 and 5 - very scary. Android application program was used for the registration of GSR. The amplitude was measured in microsiemens. GSR was registered in the 10 s pause, before the self-report on fear. Correlation between SNAQ scores, GSR amplitude and self-report scores was analyzed using Pearson's correlation quotient.

## Results and Discussion

Higher amplitudes of GSR were registered in case, when SP were evaluated as very scary and grading was 4-5. This effect was retained during entire duration of stimuli exposition. Lower amplitudes of GSR, were registered in case when SP were evaluated as either not scary, or moderately scary. This effect was retained during entire duration of stimuli exposition. Total of 25 participants, 32.9%, (Group 1), reported SP as not scary, 31 participants, 40.8%, (Group 2) evaluated SP as moderately scary and 20 participants, 26.3%, (Group 3), reported SP as very scary. All study participants displayed higher level of snake fear in SNAQ (19-21), there were no participants scoring 22, however. Mean SNAQ scores were 19.8 in the Group 1, 20.03 in the Group 2 and 19.9 in the Group 3.

No correlation of scores in SNAQ with self-reported evaluation of fear was found. Amplitudes of GSR (higher vs lower) did not correlate with the scores in SNAQ as well. Positive correlation of Higher amplitudes of GSR with the evaluation of SP as very scare was found. Lower amplitudes of GSR were found to correlate with evaluation of SP as not scary or moderately scary.

The data obtained refer to subjects, with strong (but not phobic) fear of snakes, scoring 19-21 in SNAQ. Therefore they can not be extended to general population, where the mean of scores in SNAQ

Number/ Group of participants	SNAQ scores (Mean)	Evaluation of snake photographs	SGR amplitudes (microsiemens)
25 (Group 1)	19.8	Not scary	2.1-4
31 (Group 2)	20.03	Moderately scary	0.28-1
20 (Group 3)	19.9	Very scary	0.28-1

**Table 1:** SNAQ scores, self-reported evaluation of fear and SGR amplitudes in study participants.

does not usually exceed 9-10 scores. At the same time, data obtained rise question as what do we consciously think about snakes (while fulfilling questionnaire of snake fear, for example) and what do we feel actually while running into snake (while exposed to snake photographs, for example).

## Conclusion

- The lower amplitudes of galvanic skin response are in correlation with subjective evaluation of snake photographs as either not scary or moderately scary.
- Higher amplitudes of galvanic skin response are in correlation with subjective evaluation of snake photographs as very scary.
- High scores in Snake anxiety questionnaire do not correlate neither with the amplitude (higher/lower) of skin galvanic response nor with the self-reports (not scary/scary) of fear.

## Conflict of Interest

There is no conflict of interests to be declared.

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