

Snake Fear And How It Relates To Gender Differences

Geri Glinsek

Special Program: Project Dragonfly

Miami University of Ohio

Abstract

The following study was on snake fear and how it relates to gender differences. The snake hypothesis and EPN (early posterior negativity) were discussed as contributors to why humans have fear. Many genetic and biological reasons were looked at between women and men. An online eight-question survey was designed to determine if women were more afraid of snakes than men. The χ^2 (chi-square) was 2.58. The (p)value was 0.109. There were no significant differences ($p > 0.05$) between males' and females' levels of fear. The hypothesis was not supported because only 14 people responded to the survey, and out of the 14 respondents, only four men answered. Further research on snake fear, like learning and education, could benefit both humans and snakes.

Introduction

This study will focus on a specific fear in women and men and how it might differ between each gender. According to Craske et al. (1993), defined fear or phobia in two different categories. Simple phobia or SP is where an individual is worried about a particular object or situation harming them (Craske et al., 1993). Usually, this person becomes fearful immediately when the stimulus comes into view. Agoraphobia or AG is the second category (Craske et al., 1993). A person with AG is more concerned with panicking and losing control without any stimulus present (Craske et al., 1993). However, Fredrickson et al. (1996) included a third category, social phobia. They also broke down SP into three types: animal, situational (storms, flying, heights), and mutilation phobias (Fredrickson et al., 1996). An individual with a mutilation phobia is afraid of sustaining an injury from anything (Fredrickson et al., 1996).

Snake fear is common around the world. This may stem from evolution. In the study, Who is Afraid of the invisible snake? By Grassini et al. (2016). They describe the snake detection hypothesis, "The predatory pressure of these reptiles on primates may have caused evolutionary driven changes in the primate visual system, which allows quick detection of these predators, which increases the chances for survival" (53). The snake detection hypothesis has also led to further analysis by Grassini et al. (2016). They looked at previous studies that researchers did on humans and event-related potentials(ERPs). Each study measured ERP's in humans after reacting to snake pictures and other images (birds, spiders) by using their occipital cortex area or (Early Posterior Negativity) (Grassini et al., 2016). The EPN is thought to be the critical evolutionary factor behind the snake detection hypothesis. One study showed a larger EPN amplitude for snakes than the other animal images in the study (Grassini et al., 2016). Another study used worm and snake images to compare the shape, and its results showed no difference in EPN (Grassini et al., 2016). The other study used gray images for the animal stimuli, and the only difference in EPN was for snakes (Grassini et al., 2016). After Grassini et al. (2016) looked at these previous studies, they also determined that these were all "conscious feelings" explored (Grassini et al., 2016). They wanted to take what they had learned and developed it further in their study. They decided to use colored animal images and determine if "conscious feelings" are essential for snake imagery and the EPN (Grassini et al., 2016). Grassini et al. (2016) found enhanced EPN when subjects were aware of the snake images, but it decreased as the subjects became unaware of the images.

Gender differences play an important role in fear and usually start at an early age. Usually, around age 6, more girls start to show anxiety tendencies than boys (McLean & Anderson, 2009). They are also six times more likely than boys to be diagnosed with GAD or Generalized Anxiety

Disorder. (Mclean & Anderson, 2009). From the National Comorbidity Survey, women suffer more from panic disorders, GAD, Agoraphobia, and PTSD (Mclean & Anderson, 2009). These findings may result from certain biological factors. Hormone changes during menstruation and pregnancy could lead to increased anxiety levels (Mclean & Anderson, 2009). During the late luteal phase, women tend to produce more cortisol than men's levels (Mclean & Anderson, 2009). Genetics may also be involved in gender differences and fear. Over half of the total variance in genetics includes gender differences and fear, with animal phobia being on top of the list (Mclean & Anderson, 2009). They also may be related to anxiety (AS) and disgust sensitivity (Mclean & Anderson, 2009). Anxiety Sensitivity is the fear of anxiety and its physical symptoms (Mclean & Anderson, 2009). Many studies have been conducted with women, adolescents, and adults, and they have found that women have a higher AS (Mclean & Anderson, 2009). As in AS, women also had reported higher disgust sensitivity than men (Mclean & Anderson, 2009). From these discovered findings and previous observations, women should be more afraid of snakes than men.

Methods

The study subjects were 15 women and 15 men between the ages of 21 and 75 who have a fear of snakes. An eight-question survey was designed using an online application service called Survey Monkey. Using an online survey was a more convenient approach because it was easy and fast. The questions were primarily nominal and ordinal. Each subject was asked to choose if they were female, male, or other. For age, they had to pick a range (21-29, 30-39, 40-49, 51-59, 60 or older). The subjects also had to select their highest education level, either high school or earned college credits but did not graduate, 2-year, 4-year, or graduate-level degrees. They also had to choose if the city, farm, or other was where they grew up. The following questions the

subjects were asked were if they had encountered a snake or not, and if so, was it in the snake's natural habitat, zoo, museum, or other. A rating scale from 0 (no fear) to 7 (extreme fear) was provided so the subject could rate their snake encounter. The last question collected from the subjects was their thoughts on what they think of a snake. The survey was sent out randomly through social media. A trial run was done from June 19th-June 24th. Then the actual run was done through June 25th-July 7th. Once the two weeks were done, then the finished surveys were collected for further analysis. Two weeks seemed like enough time to have subjects respond and have enough samples for the data. Comparison bar graphs were done for seven of the eight questions. The last question was qualitative, so a table was used. The best statistical method for the data was the chi-squared test since a survey is designed for comparing frequencies of several individuals in two groups.

Results

Only 14 people responded to the survey compared to the expected outcome of 30. Only four men answered the survey, which left the remaining ten women (Fig. 1). The critical value was 3.84 with 1 DF and a 95% confidence level. The χ^2 (chi-square) was 2.58. The (p) value was 0.109. There were no significant differences ($p > 0.05$) between males' and females' levels of fear. For both females and males, ages 30-39 were the most significant (Fig. 2). For both men and women, four responded that were ages 30-39 (Fig. 2). Three females ages 21-29 answered, but no males. No individual responded that was age 50-59 (Fig. 2). For the education level completed, more people with a 4-year degree answered the survey. However, more females with a 4-year degree responded than men (Fig. 3). Five women grew up in the city compared to 1 man who completed the survey (Fig. 4). Growing up on a farm was equal between genders (Fig. 4). All 14 subjects had encountered a snake, but females had more encounters than males (Fig. 5).

The place that subjects mostly encountered a snake was its natural habitat (Fig. 6). Only one individual reported encountering a snake at a zoo (Fig. 6). When rating (0-no fear to 7-extreme fear) on the experience, women responded more with a 4, but no men (Fig. 7). A rate of 5 was equal between both genders (Fig. 7). Only one male responded with a zero. Only two women gave the highest rating, which was a 6 (Fig. 7). Only eight females reported their comments on the last question (Table 1.) because two females did not respond for unknown reasons. More women had detailed comments about the benefits of snakes than men (Table 1). More males responded with simple disgusting comments than females (Table 1.).

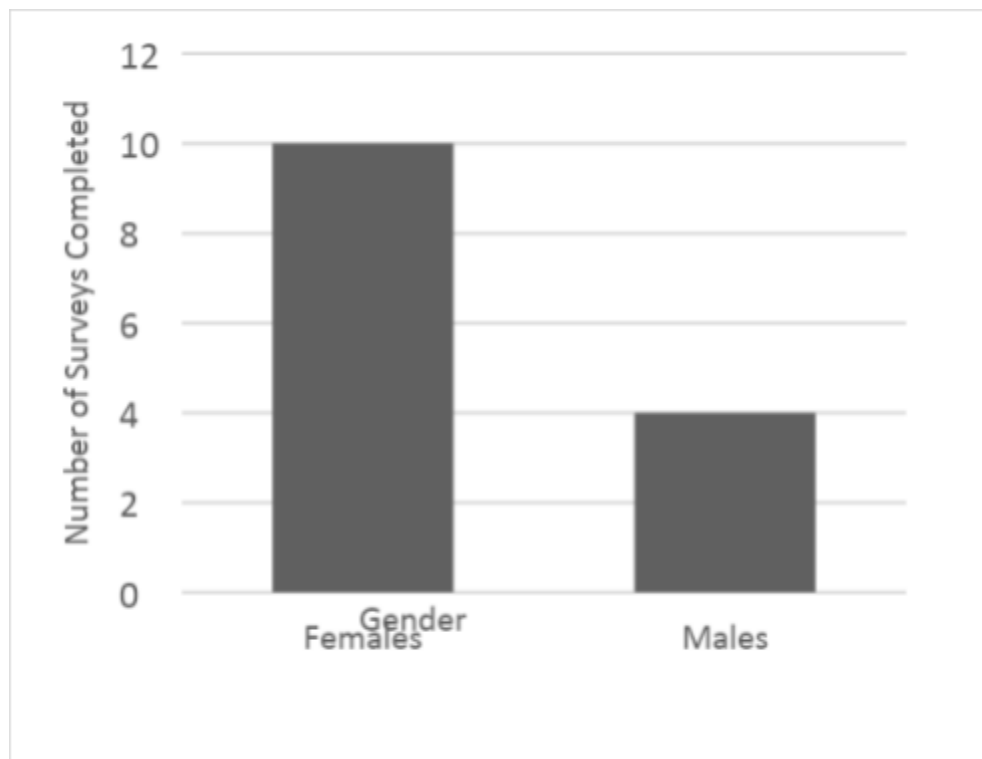
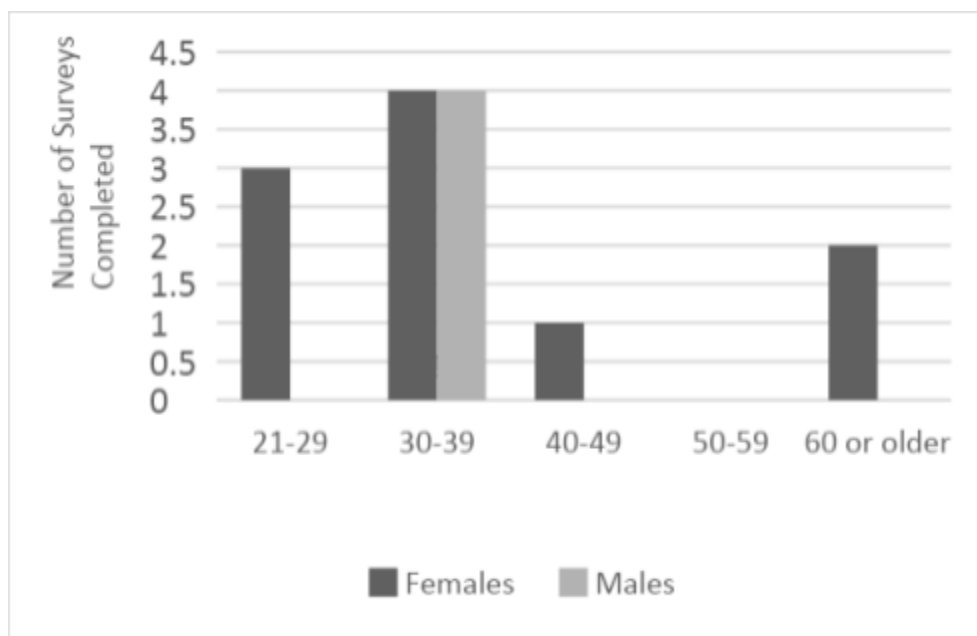
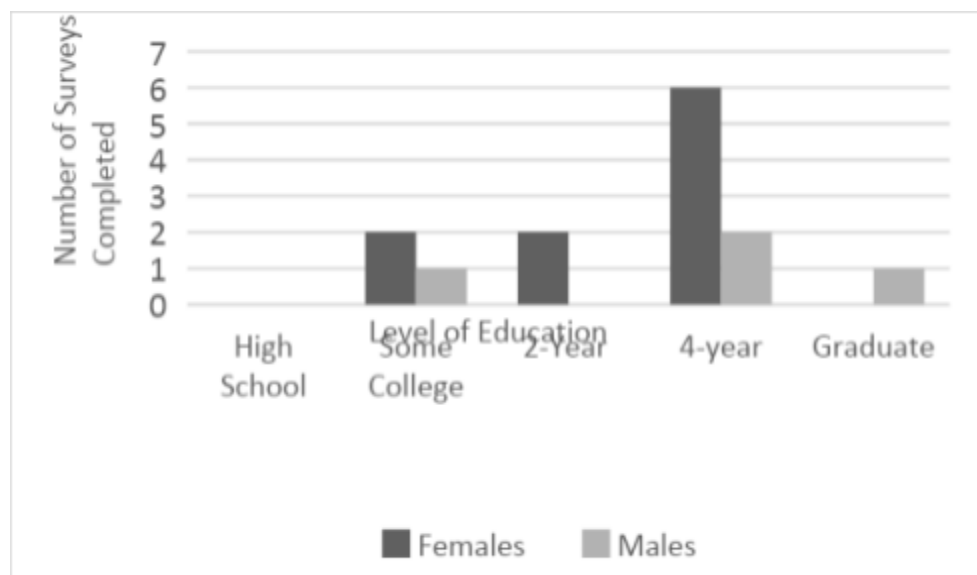
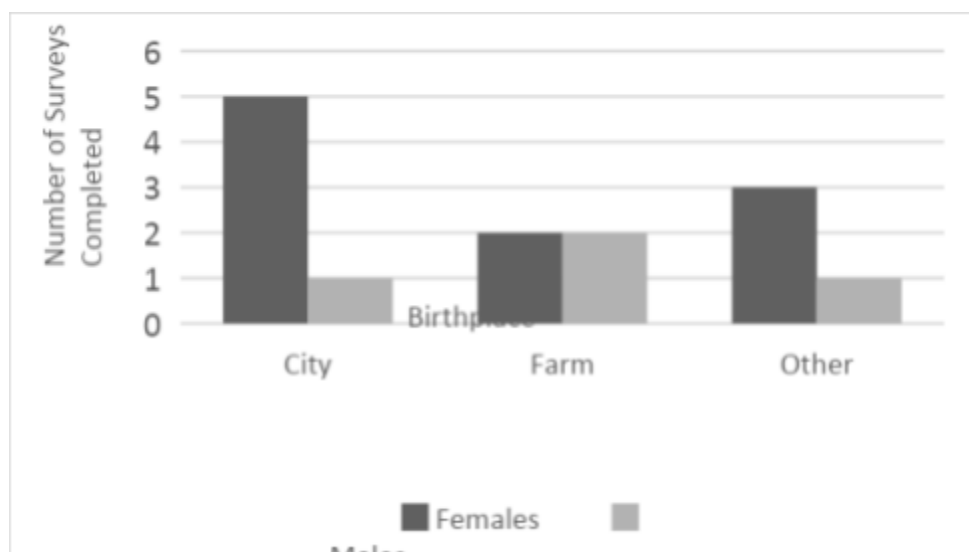
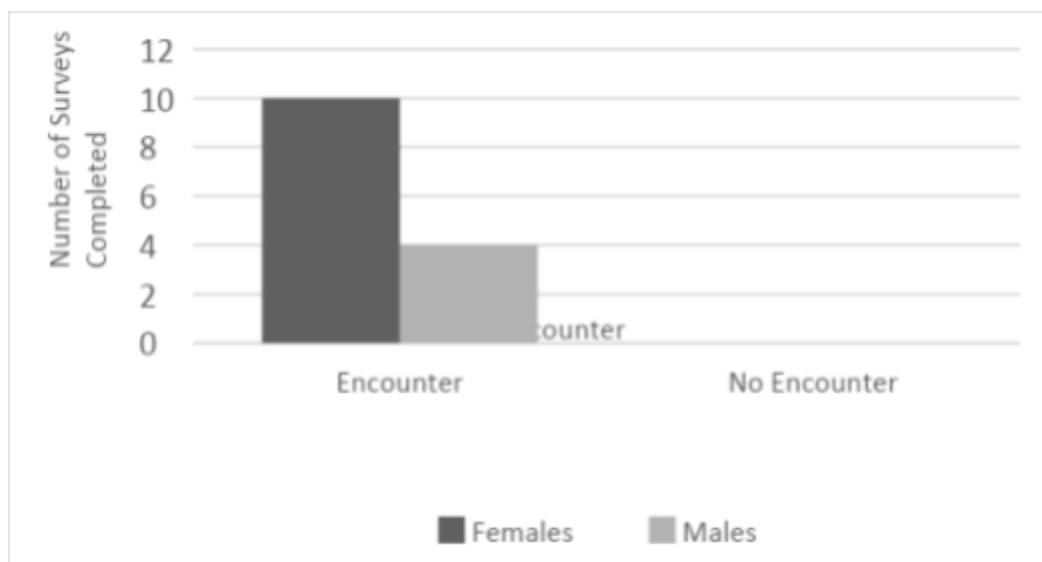


Figure 1. The number of females and males that completed the survey.

**Figure 2****Figure 3**

**Figure 4****Figure 5**

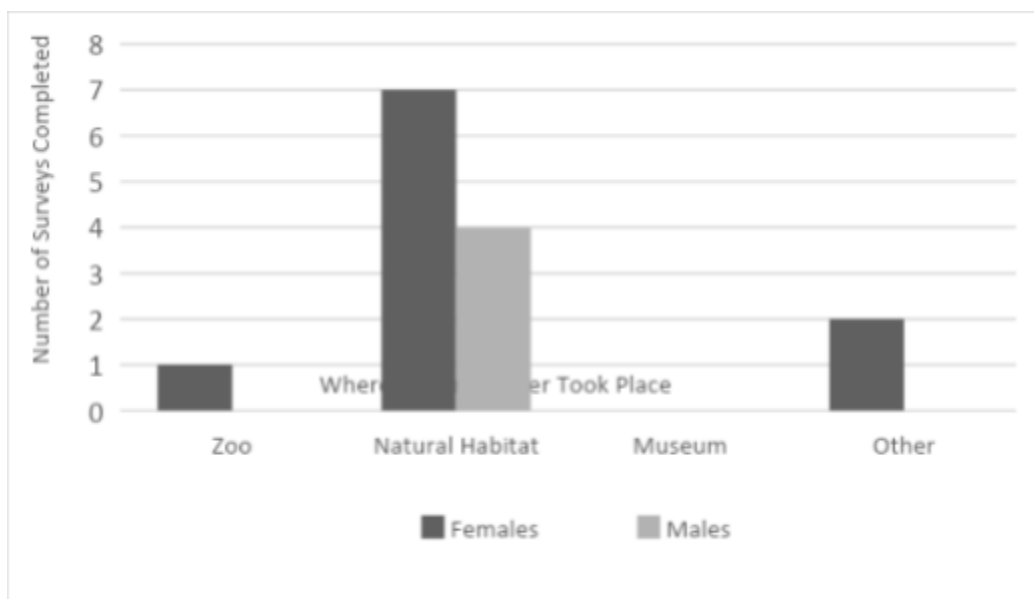
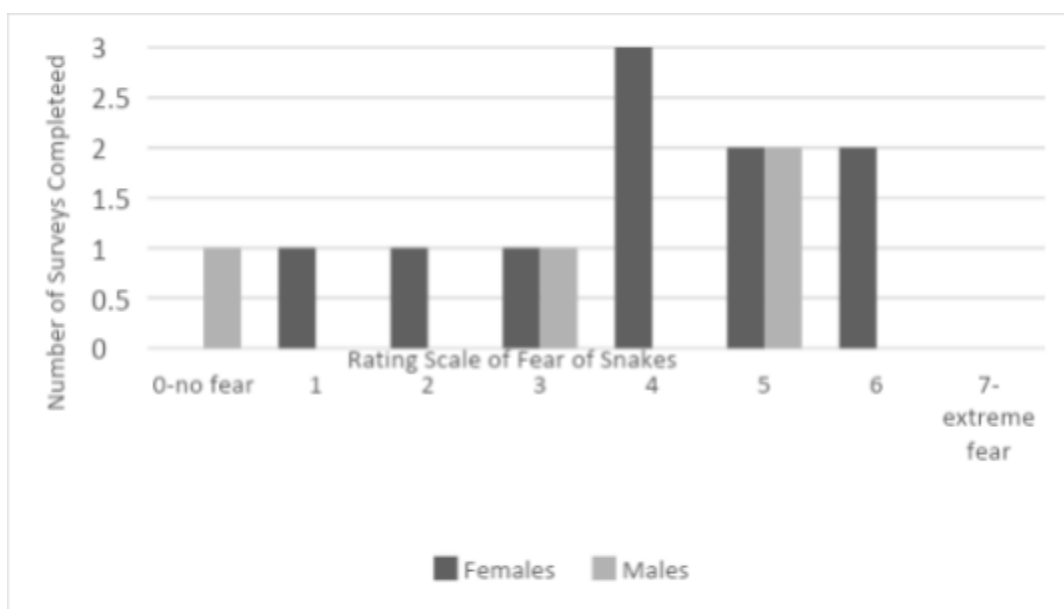
**Figure 6****Figure 7**

Table 1. Both females and males' responses of what comes to mind when they think of a snake.

Females	Males
Sneaky	Snake
Slithering	leave them alone
Fast	Yucky
Run!!	creepy; gross
Helpful for the environment	
Worried about getting one with the mower	
Gross	
Pest Control	

Discussion

I had expected to find that more women than men were afraid of snakes, but the hypothesis was not supported. The main reason it was not supported was that the expected outcome was 14 instead of 30. After the trial run, which yielded no responses, I sent a message on the survey. It let people know that the survey was quick and easy. Then I started getting responses, but not enough for the sample size. A manual survey might have given me better results. People might feel obligated to complete it if someone is handing it to them. Another reason was more women responded to the survey than anticipated, which skewed the results significantly. Also, on a couple of the survey questions, subjects chose others but did not specify. Twenty-one was the starting age on the survey, but education ultimately started with high school. If I had included a younger age range, the expected outcome would have been higher.

Evolutionary, biological, and genetic aspects play a role in fear and how it relates to gender differences, but what about fear being learned. According to Hunt et al. (2006), "Fear can be

learned through many ways. Vicarious learning, social transmission of information and instruction". Since looking at learned behavior, what about where it starts. Two studies were done on 9-month old and 18-36-month-old infants. They had infants look at videos of snakes and other videos with less-feared animals (ex. Elephants) (Thrasher & Loebe, 2016). The results showed no significant change in infant behavior. Some infants even tried to catch the snake as it was moving on the monitor. Since the researchers could not conclude it was fear, they noticed increased awareness in the infants (Thrasher & Loebe, 2016). To rule out fear, they decided to do another study to determine if snakes increased infants' awareness. The subjects were 6-9-month old infants. Auditory and visual stimuli were used. The auditory stimuli were recordings of fearful or happy voices (Thrasher & Loebe, 2016). The visual stimuli again were videos of snakes and other less feared animals (Thrasher & Loebe, 2016). They measured the infant's heart rate, and low heart rate implied increased awareness (Thrasher & Loebe, 2016). It determines that infants experienced increased awareness when seeing a snake, but not fear (Thrasher & Loebe, 2016).

Action Component

This study determines if women were more afraid of snakes than men. Why would that be important? It is important because having fear or phobia can cripple a persons' life. If we continue to do research, we could save millions of people's lives suffering from this condition. We also need to think about snakes. Some are endangered, like the milk snake and twin-spotted rattlesnake, which would be the underlying cause for this. Is education the issue? Are people afraid of snakes because they do not understand them? Have people done studies on snake phobia and education?

References

- Craske, M. G., Zarate, R., Burton, T., & Barlow, D. H. (1993). Specific fears and panic attacks: A survey of clinical and nonclinical samples. *Journal of Anxiety Disorders*, 7(1), 1-19.
- Fredrikson, M., Annas, P., Fischer, H., & Wik, G. (1996). Gender and age differences in the prevalence of specific fears and phobias. *Behaviour research and therapy*, 34(1), 33-39.
- Grassini, S., Holm, S. K., Railo, H., & Koivisto, M. (2016). Who is afraid of the invisible snake? Subjective visual awareness modulates posterior brain activity for evolutionarily threatening stimuli. *Biological Psychology*, 121, 53-61.
- Hunt, M., Bylsma, L., Brock, J., Fenton, M., Goldberg, A., Miller, R., ... & Urgelles, J. (2006). The role of imagery in the maintenance and treatment of snake fear. *Journal of Behavior Therapy and Experimental Psychiatry*, 37(4), 283-298.
- Kendler, K. S., Jacobson, K. C., Myers, J., & Prescott, C. A. (2002). Sex differences in genetic and environmental risk factors for irrational fears and phobias. *Psychological Medicine*, 32(2), 209-217.
- McLean, C. P., & Anderson, E. R. (2009). Brave men and timid women? A review of the gender differences in fear and anxiety. *Clinical psychology review*, 29(6), 496-505.
- Nawas, M. M., Welsch, W. V., & Fishman, S. T. (1970). The comparative effectiveness of pairing aversive imagery with relaxation, neutral tasks and muscular tension in reducing snake phobia. *Behaviour Research and Therapy*, 8(1), 63-68.

Polák, J., Sedláčková, K., Nácar, D., Landová, E., & Frynta, D. (2016). Fear the serpent: A psychometric study of snake phobia. *Psychiatry research*, 242, 163-168.

Thrasher, C., & LoBue, V. (2016). Do infants find snakes aversive? Infants' physiological responses to "fear-relevant" stimuli. *Journal of experimental child psychology*, 142, 382-390.