

The Power of Fear: The Effect Of Threat On Perceived Proximity

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Research suggests that cognition plays a large role in the perception of a stimulus. More specifically, threatening stimuli such as an artificial spider are perceived as closer than neutral stimuli such as a cup (Cole, Balcetis, & Dunning, 2013; Stamps, 2012). This study hypothesized that a threatening stimulus will be perceived as closer to the observer than a neutral stimulus. Thirty undergraduate students from Belmont University participated in a scenario in which two neutral stimuli and two threatening stimuli were presented at four pre-randomized distances ranging from 50 - 100 inches. Participants estimated their perceived distance away from each stimulus. This study concluded that while some people perceive a threatening stimulus as being closer than a neutral stimulus, this may not always be the case. This research adds to the understanding of human cognition and our perceptions of reality in various environments.

Cognition, perception of a stimulus, and emotion all play a large role in daily life (Pichon, de Gelder, & Grezes, 2012). Various experiments suggest that feelings of anxiety and threat caused by a stimulus can make the stimulus appear closer than its actual distance (Cole, Balcetis, & Dunning, 2013). Psychologists have studied the effect of distance on perceived threat (Stamps, 2012) and the effect of threat on perceived distance (Cole et al., 2013). This is an area of research which analyzes the temporary emotional effects that certain stimuli have on the perception of an individual. These findings can provide important information about how human perception is influenced by threat, as well as predict behavior resulting from this altered sense.

Cole et al. (2013) concluded that the negative emotion of threat has a greater effect on altering perception than the negative emotion of disgust. Their research involved a study in which participants were seated in a room with a tarantula on a table positioned at a relatively far distance. The participants were asked to rate any feelings of disgust and threat, as well as estimate how far away the tarantula was in inches. This study showed a significant link between increased threat and a closer 'perceived proximity' of the threatening object. These results prompted us to look further into this phenomenon.

Pichon et al. (2012) focused on whether or not the brain undergoes changes in reaction when the 'fear' emotion is experienced. This study analyzed the changes in the brain which help link the negative emotion of fear with a participant response. Pichon et al. (2012) examined the motor-related areas of the brain and a reaction response to 3-second videos designed to induce fear. During the video slide-show, the participants' brains were in a constant fMRI scan, allowing for direct and active feedback. Results showed that the fear stimulus sped up participants' reaction times and created the potential for real action responses.

Extensive research has been done on the relationship between threat and distance. In a study conducted by Stamps (2012), perceived threat was measured by using distance as the

independent variable. It was hypothesized that the strength of communicated non-verbal threat towards a person may vary from distances 30m to 90m away. Participants rated how threatened they felt towards a person that was standing at different distances in pictures. The data reported a negative relationship between threat and distance from 30m to 90m away suggesting that as distance increases, perceived threat decreases.

Furthermore, Nieuwenhuys, Cañal-Bruland, and Oudejans (2012) explored the impact of threat on distance perception and behavior by presenting armed police officers with threatening stimuli. The authors hypothesized that in threatening situations, distance judgments would not be as accurate as in low-threat circumstances. Fifty-five police officers were divided into two groups: an actual response group (AR), and a verbal response group (VR). Both groups were presented with low and high-threat stimuli, a man with a plastic knife or a real knife, respectively. When the approaching man did not respond to the officers' orders to stop, he was shot at the appropriate time by guns with colored soap cartridges. In both groups, visual matching was used to assess distance judgments. Results showed that high threat situations led to earlier shooting in the AR group. This suggests that anxiety alters the relationship between distance and perceived threat. In other words, a threatening stimulus will appear closer than a non-threatening one.

This current study is similar to Cole et al. (2013) in that we are observing the effects that threat has on an observer. However, unlike the Cole et al. (2013) research, the effects of disgust were not examined in this study. It was hypothesized in our study that a threatening stimulus would be perceived as closer to the observer than a neutral stimulus.

Method

Participants

Our study was conducted of the Belmont University undergraduate program enrolled in introductory psychology courses. There were a total of 23 participants with 12 men and 11 women. The age of the participants ranged from 18-41 years ($M= 22.65$, $SD= 5.45$). The majority of our participants were classified as freshmen.

Materials

This study required a consent form, a demographic form (which evaluated age and gender), two neutral stimuli, two threatening stimuli, a tablecloth, and a poster board. The study also included both an adapted emotional threat scale and an adapted perceived distance survey from Cole et al. (2013) which included an inch reference for the participants. Participants were presented with two neutral stimuli (e.g., a teddy bear and a paper cup) and two threatening stimuli (e.g., a fake spider and a fake snake both in cages). A tablecloth was draped over the table where the stimuli were presented in order to eliminate any details that might influence perceived distance. However, there were four distance markings (measured at 45.5in., 60in., 64.5in., 73.5in.) on the tablecloth which were only visible to the researchers. The poster board was used to block the participants' view between each distance marker transition in order to avoid the participants from comparing the distance markings.

The adapted emotional threat scale by Cole et al. (2013) was used to measure subjective feeling of threat towards each stimulus as a manipulation check for our study. Within the adapted

emotional threat scale, we created a priming color description, which was used to avoid demand characteristics from the participant. Participants reported how threatened they felt towards each stimulus from a Likert scale of 1 (not threatened at all) to 7 (very threatened). The adapted perceived distance survey by Cole et al. (2013) was used to measure perceived distance towards each stimulus. Participants estimated how far they are from each stimulus in inches.

Procedure

This study took place in the similar rooms using the similar tables for every session. Preparation for each session consisted of aligning the table to an elongated position and covering it with the tablecloth. There was only one participant will be in each session. The participant was first seated at the end of the table with the tablecloth on it. The researchers then presented them with a consent form and a demographics form.

Participants were presented each stimulus in the following order: spider, teddy bear, snake, and cup. They first received the adapted emotional threat scale for each stimulus (Cole et al., 2013). Next, the researchers used the adapted perceived distance survey (Cole et al., 2013) while the participants gave a verbal response of an estimated distance for each presented stimulus. During this procedure, each stimulus was presented one at a time at one of the four distance markers in four different trials. The poster board was placed in front of the participant with each change of stimulus and distance marker. All stimuli were presented in the same order; however, the distance markers were randomized for each trial. After completion of the adapted perceived distance survey (Cole et al., 2013) for each stimulus, the session was be ended. Lastly, the participant was debriefed on the actual purpose of the study.

Results

Our statistical analysis focused on participants' average inch-estimates for each of the four stimuli. However, the adapted emotional threat scale (Cole et al., 2013) was used to check for any manipulation effect on our threatening and neutral stimuli. In order to measure perceived threat, we used a 7-point Likert scale, 7 being extremely threatening, and 1 signifying no threat. The threatening stimuli resulted in the following values: the spider was given a mean rating of 2.26 and a standard deviation of 1.66, and the snake was given a mean rating of 2.00 with a standard deviation of 1.22. The neutral stimuli (teddy bear and cup) were both given mean ratings of 1.00 with standard deviations of 0.00. The level of perceived threat between the threatening and neutral stimuli revealed a significant difference, $F(3, 367) = 37.96$ and $p < 0.001$. We statistically analyzed perceived distance results by running a two sample t-test to compare mean values perceived proximity from each stimulus, taking into consideration the participant's perceived threat as well. With these numbers we found mean perceived distances for our threatening stimuli to be as follows: Spider ($m = 60.37$, $SD = 27.43$) and Snake ($m = 62.25$, $SD = 28.14$). Our neutral stimuli resulted in the following: Teddy Bear ($m = 61.90$, $SD = 28.23$) and Cup ($m = 62.77$, $SD = 28.27$). This two sample t-test was not significant, $F(3, 367) = 0.13$ and $p < 0.95$.

Discussion

As stated previously, our hypothesis was not supported by our findings. Although the threatening stimuli were being perceived as more threatening, it did not alter responses to a significant enough degree for us to rule out chance as the cause for altered perceptual experiences. Averaging out the results, we found that the spider stimulus was perceived as being a few inches closer than the other three stimuli, but this may have been due to unequal distance marker distribution. Since all distance markers were randomized for every trial, the spider resulted in being placed at the 45.5in. distance marker more than the other stimuli were placed at the 45.5in. distance marker.

Cole et al. (2013) found evidence supporting the fact that a live tarantula was both threatening to participants and therefore caused them to perceive it as being closer. In comparison to Cole et al. (2013), our data did not support the findings. However, our fake spider and fake snake were perceived as threatening to the participants, similar to the Cole et al. (2013) study. Despite this, the responses did not match previous findings, so we concluded that our stimuli were not prompting genuine fear responses tied to perceived threat as supported in previous research (Cole et al., 2013; Nieuwenhuys et al., 2012).

Some of the limitations of this study involved our stimuli not being genuinely threatening, which suggests the possibility of the participants having responded with demand characteristics on the adapted perceived threat scale (Cole et al., 2013). We discovered that in an effort to randomize the distance marker trials for the presentation of our stimuli, we were unable to use each distance marker evenly for each stimulus. This may have had an effect on the results we found concerning the spider's mean perceived distance towards the participants. Our results however seemed to be heading in the direction of having a positive correlation between the threatening stimuli and perceived distance, which leads us to believe if we had more participants, we may have found statistical significance. Overall, we also experienced having a low presentation trial amount for the study. Each participant only responded to the four stimuli four different times at the random distance markers. Adding a larger amount of distance marker presentation trials, potentially increasing from 16 trials to 32, could have brought a newer element of validity to this study.

As for future research, it would be important to see a replicated study using a live tarantula like in the Cole et al. (2013) study as well as a live snake. This would portray a similar setup as in the present study, but with threatening stimuli that are alive which could provoke different results. Since some participants may have exhibited demand characteristics in this study, it is recommended for future research to use a more concealed research intention so the participants are less aware of the potential hypothesis.

In conclusion, while some people perceive a threatening stimulus as being closer than a neutral stimulus, this may not always be the case. When reviewing our findings, the results of this study are similar to previous studies (Cole et al., 2013; Nieuwenhuys et al., 2012), with the exception of statistical validity.

References

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