Course: Visual perception and the brain
Assignment 1: The Ponzo effect
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Possible explanation for the Ponzo effect
A possible explanation for the Ponzo effect can be that the lines on the sides provide the suggestion of depth due to their convergence to a single point. Due to our experiences of perceiving similar scenes (e.g. a railroad) of perspective, it might be possible our brain makes us believe the higher of the two horizontal lines is longer than the lower one. In real life situation this is indeed the case.

As the Ponzo effect is not evenly observed by different cultures (Shireav, 2007), this can be explained by the hypothesis by stating that manmade object in industrialized societies have resulted in scenes such as railroads and roads that have influences the perception. In cultures that do not feature these long straight elements, perception has not learned to accommodate these scenes and therefore witnesses this effect to a lesser extent or not at all.

Testing the explanation
Using the above explanation two experiments can be run to see if the hypothesis can be confirmed. These experiments are described here:

Experiment 1: varying the angle of the outer lines
In the first experiment, the angle of the outer lines is varied while maintaining the position of the horizontal lines. By changing the angle of these lines, the perception of depth can be simulated (lines with an angle closer to a vertical line simulate a greater depth). In our hypothesis of perspective this should lead to a change in perceived length with be increasing as the angle of the lines decreases (compared to a vertical line).

Experiment 2: varying the distance between the horizontal lines
In the second experiment, the distance between the horizontal lines is varied while maintaining the angle of the outer lines constant. By changing the distance between the lines, the relative height of the lines to each other changes. In our hypothesis of perspective this should lead to a change in perceived length with the perceived length will be increasing as the distance between the horizontal lines increases.

Impact of test results on the concept of vision
If the experiments yield the expected results, they confirm the idea that the Ponzo effect is caused by the brains' ability to expect lines of similar length to reduce in length if placed further away. Therefore, if lines that are actual the same length, are presented in an Ponzi image, the brain has learned through the presentation of similar images, that these lines should not have the same length. This would further strengthen the empiric approach towards vision that was presented in the course.

References

Shiraev, E.; D. (2007). *Cross-Cultural Psychology* (3rd ed.). Pearson Education, Inc. p. 110.