



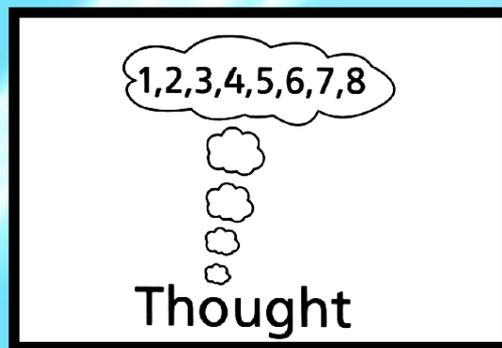
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Title	Do Males and Females Differ in their Ability to Solve Visual Puns?
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Introduction

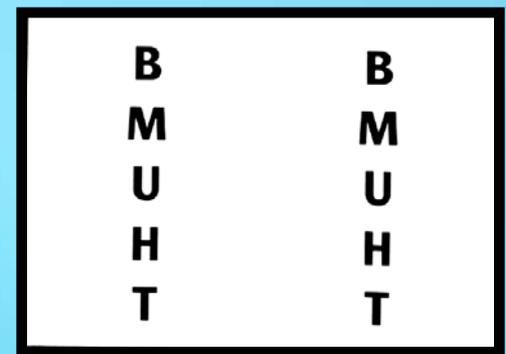
Visual puns are common expressions that have been represented graphically. While working in Residence Life at my college, I have posted hundreds of these puzzles outside my door for residents to solve. Surprisingly, my male residents appear to be significantly more proficient in solving these puns than my female residents.



Star Wars



It's the thought that counts



Two thumbs up

Introduction

Research completed in 2008 observed a similar male advantage in completing visual tasks. The authors of the study suggested that a male's heightened spatial abilities can be tied to increased folding of gray matter of the parietal cortex of the brain (Soglin 2008). Another study suggests that sex-based differences in spatial ability arose from different evolutionary pressures (Burke 2012). Despite competing arguments as to why males have this advantage, most research agrees that males have an advantage in spatial reasoning over females.

TUNNELIGHT

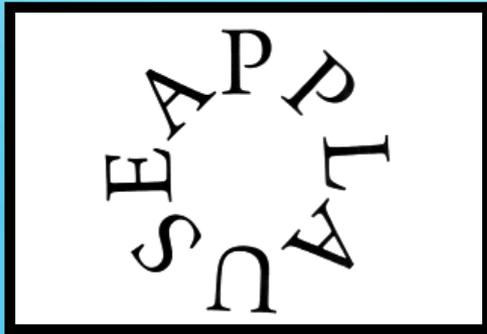
*Light at the end of
the tunnel*

THAT IS •

*That is beside the
point*

Introduction

In my study, I expect that males will perform significantly better than females in my timed visual pun survey.



Round of applause



Rising to the occasion



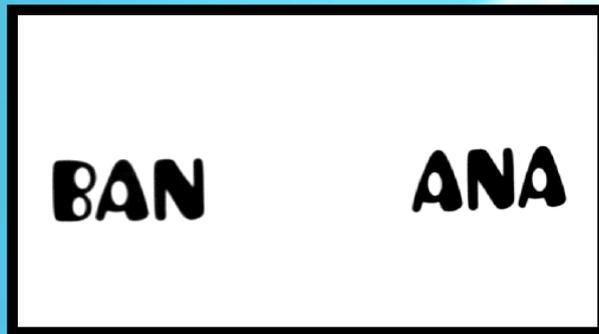
Double or nothing



Planning ahead

Methods

To complete my study, I created a survey composed of 16 different visual puns. I then met with each section of a freshman residence hall during section meeting to distribute the surveys. After recording their gender, each resident was given 75 seconds to complete as many puns as possible. The data recorded from each survey was gender and the number of correctly solved visual puns.

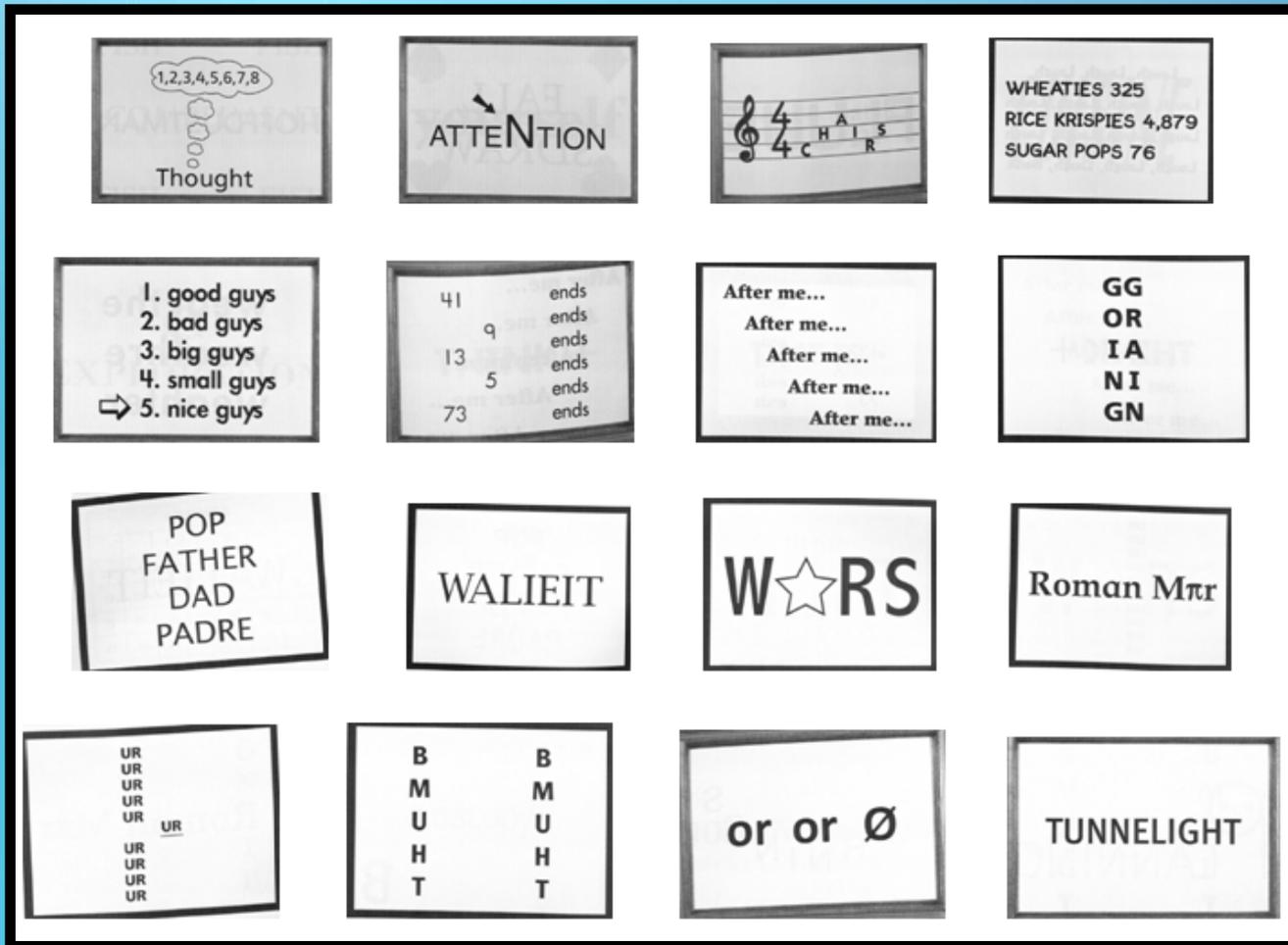


Banana split



Roman empire

Methods



Visual pun survey: these particular puns were chosen because they employed a variety of different pun representations and are particularly common expressions.

Results

Approach:

A two sample t-test will be used here since the explanatory variable is binary categorical and the response variable is quantitative.

Null and Alternative Hypotheses:

Null: $\mu_m - \mu_f = 0$

The visual pun solving abilities of males and females do not differ on average.

Alternative: $\mu_m - \mu_f > 0$

Males will be able to solve significantly more visual puns on average in 75 seconds than females.

Results

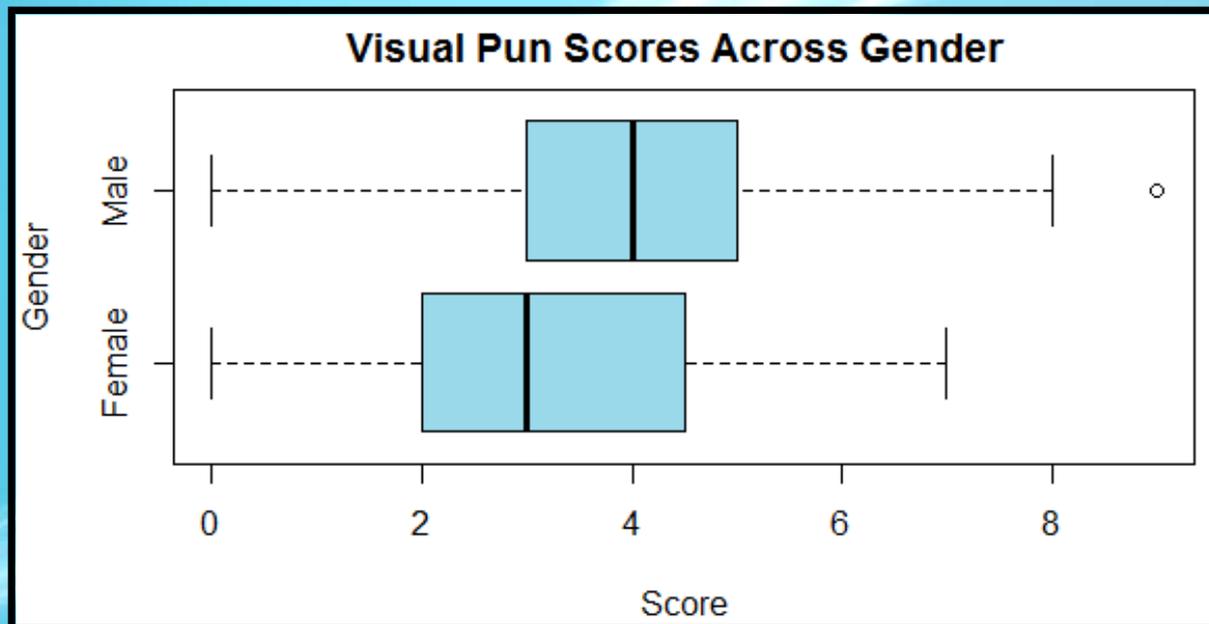
Descriptive Analysis:

Initial summary statistics indicate that males are more proficient than females in solving visual puns. Males solved 3.94 puns on average while females solved 3.24 puns. However, the standard deviation values are large relative to the average score, so it difficult to determine if the results are statistically significant.

	Males	Females
Number of Participants	35	51
Average Score	3.94	3.24
Standard Deviation	2.13	1.72

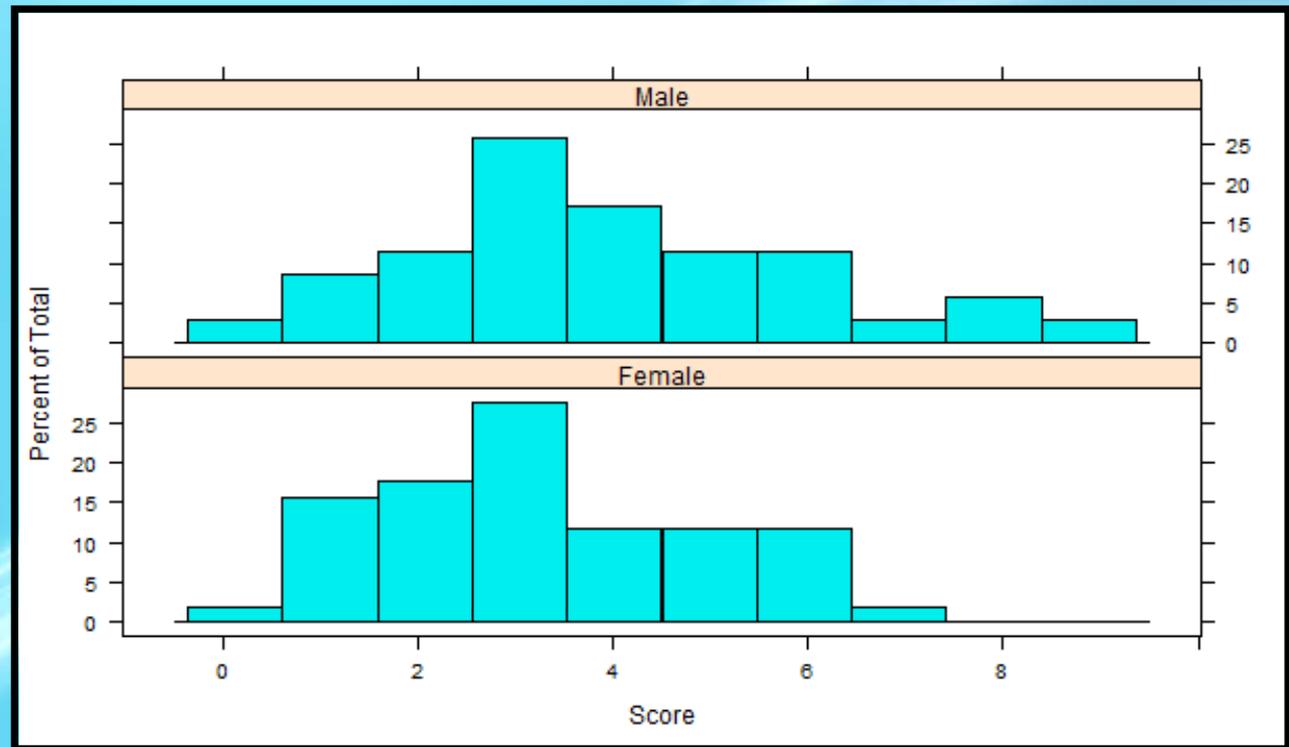
Results

A box plot of values for each gender supports a similar conclusion. The 25th quartile, median, and 75th quartile for males are higher than the corresponding values for females. However, the considerable overlap requires statistical analysis to know if the results are statistically significant.



Results

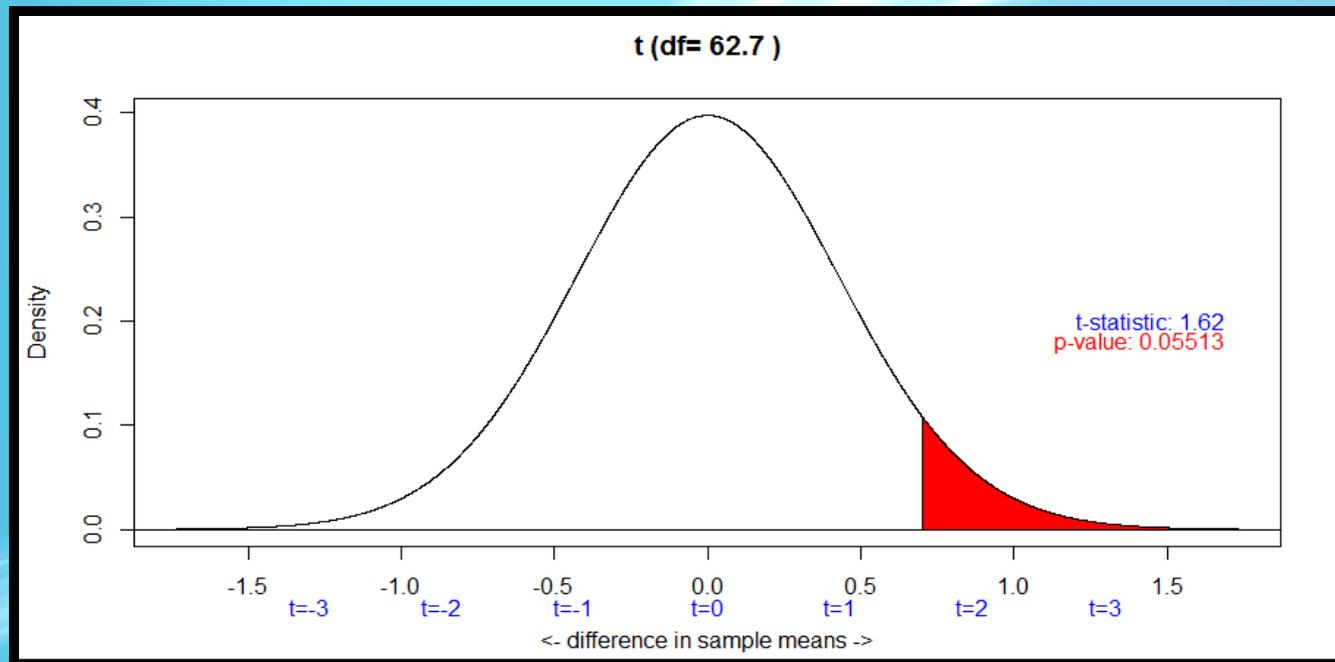
A histogram of scores for both males and females does not shed any further light on trends. However, it does appear males did receive the highest scores. At this point, inferential analysis is required.



Results

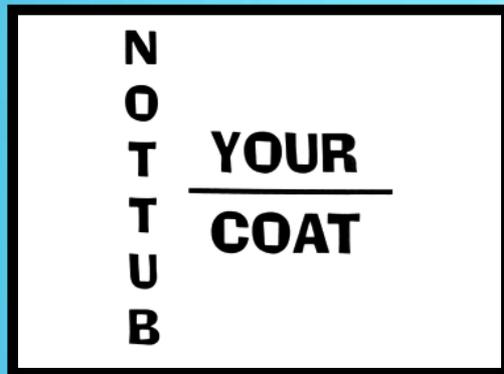
Inferential Analysis:

Because the sample sizes are large and the conditions of the Central Limit Theorem are met, a two sample t-test is appropriate to apply here. Computing software reveals the p-value to be .0551 and the test statistic to be 1.62.



Discussion

Under the null hypothesis that males and females do not differ in pun solving abilities, there is a 5.51% probability of seeing the observed difference of .7 puns or more extreme. Thus, at a significance level of $\alpha=.1$, we reject the null in favor of the alternative hypothesis that males can solve significantly more visual puns in a limited time frame than females on average.



Button up your overcoat



Trapeze artist

Discussion

The observed result is 1.62 standard deviations above the expected difference of zero. From results found here, we are 90% confident that a freshman male from this college will solve approximately zero to 1.42 more visual puns in 75 seconds than a female on average. Because the confidence interval includes zero, these results are only marginally significant.



Amazing Grace



Open for business

Discussion

This study can be generalized to college freshmen who live in this particular dorm and regularly attend section meetings. Students self-select themselves to live in this building and choose when to attend section meetings, so several factors may be systematically different about these students than other freshmen on campus. As a result, a significant limitation of this study is its limited generality. At best, we can generalize results to all freshmen who have ever lived in this particular hall.



Frame of reference



Think positive

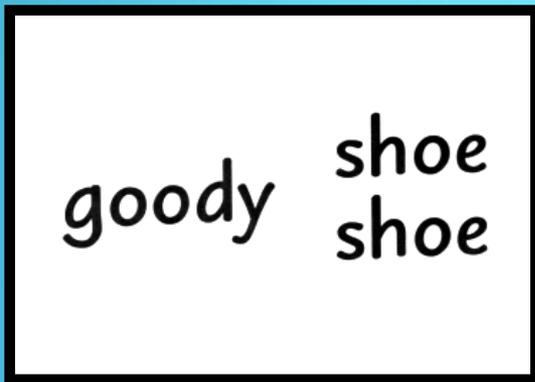


The game is afoot

Discussion



Talk in circles



Goody two-shoes

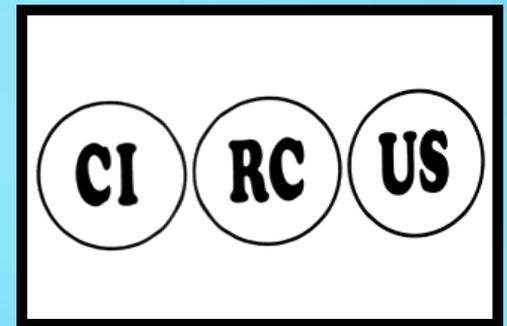
Another limitation of this study is its reliance on the idiomatic English language. Students who speak English as a second language may not have been able to fully demonstrate their ability to solve visual puns due to a language barrier. Some of these puns may also be more ingrained in particular cultures than others.

Discussion

Several improvements could be made to this study if repeated in the future. First, I would create a longer survey with more puns and allow more time for solving them. This might better polarize the results between males and females and more clearly illustrate the difference in visual abilities. Second, I would vary the order of the puns on the survey. This would eliminate any effects ordering had the results. Third, I would keep track of which puns were most commonly solved amongst males, females, and both genders. This data may offer an interesting insight into pun solving abilities of each sex.



Family tree



Three ring circus

Discussion

Possible future work includes investigating which types of visual tasks males perform best. Another topic of current interest is determining whether biological or cultural influences lead to different spatial abilities between the sexes. The effects of differing visual abilities across gender could possibly be linked to the higher representation of males in STEM careers. Further investigation of this topic could lead to a better understanding of sex-based differences in visual abilities and thus possibly reveal how to achieve a more equal representation of men and women in STEM fields.

References

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- Soglin, Becky. "Sex Difference on Spatial Skill Test Linked to Brain Structure." *Science Daily*, 18 Dec. 2008. Web. 21 Nov. 2012.
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