

# WRITING THE ARTICLE

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# Research Article – Basic Format

- Abstract: mini version of article
- Introduction
  - Background Information
  - Problem statement or hypothesis
  - Significance
- Materials and Methods
  - How was the research carried out?
  - Sufficient detail is provided so study can be repeated
    - All experiments and observational studies are explained
    - Statistical, mathematical or computational methods are explained and referenced if appropriate
    - Code and/or data are made available (e.g., on Github)
  - Description of *new* methods do not go here (these are Results)

# Research Article – Basic Format

- Results

- An unbiased presentation of the results obtained from carrying out the methods
- Graphs and tables should be used to present results
- If the paper describes a new method, tool, or program, that would be described here

- Discussion

- Implications of the results are put into the context of the discipline (with respect to other published research)
- The significance of the results are discussed (with respect to published research)
- Limitations of the study are discussed (with respect to published research)
- Possible extensions and future work are discussed (with respect to published research)

## Outline of Hypothetical Example – GD sort vs. quick sort

- Introduction

- Background Information

- Sorting elements alphabetically or by value is a common problem in computer science
    - Common sorting algorithms include....

- Problem statement or hypothesis

- Slow sorting algorithms can slow down programs and limit analyses that depend on sorting, particularly for large datasets

- Significance

- The development of a faster sorting algorithm would allow for more rapid sorting of large datasets that currently cannot be sorted in a reasonable time

## Outline of Hypothetical Example – GD sort vs. quick sort

- **Materials and Methods**

- All sorting algorithms are implemented in C++, compiled using Microsoft Visual Studio 2015, and tested on machines running Windows 8.1 with a 4th Generation Intel® Core™ i3-4160 Processor.
- For quicksort, implementation in library XXX was used
- Sorting performed on
  - 1 billion random integers between +/- 1 billion, and repeated 1000 times.
  - 1 billion random character strings between 2 – 20 characters
- Running times are compared using the two-sample t-test.

## Outline of Hypothetical Example – GD sort vs. quick sort

- Results

- Description of GD-sort, with Figure showing pseudocode
- Theoretical running time of GD-sort is derived
- Bar graphs comparing GD-sort with quick-sort
  - On 1 billion randomly generated numbers between -1 million and + 1 million
  - On 1 billion randomly generated character strings of sizes 10-20.
- In both cases, GD-sort is significantly faster than quick-sort (expected)

## Outline of Hypothetical Example – GD sort vs. quick sort

- Discussion

- Theoretical running time shows GD-sort has faster average running time than quicksort
- Experimental results confirm these findings in the datasets we looked at
- Related work
  - Multiple references indicating quicksort is 'best' or most popular
  - Quicksort has previously been improved with multiple pivots
- Limitations / future work – It remains to be seen how
  - GD-sort performs on nearly sorted datasets (reference showing that performance of sorting methods depend on how sorted the data is)
  - Changing the selection of the pivot used in GD-sort might effect the running time

# The FB study

- Introduction
  - Background Information
    - No evidence of social contagions without direct interactions
    - Even then, many studies are observational, not experimental
    - Research suggests that exposure to happiness can be depressing
    - FB must decide what content to show or omit from a person's newsfeed
  - Problem statement or hypothesis
    - Does exposure to positive/negative posts change the emotional content of a user's posts?
  - Significance
    - Would be first to show that emotional states can be transferred to others in the absence of direct interaction



## The FB study

- **Materials and Methods**

- Posts are deemed positive or negative based on Linguistic Inquiry and Word Count software
- Experiment:
  - Control – a proportion of posts eliminated at random
  - Treatment – a proportion of positive or negative posts were eliminated at random

- **Results**

- Figure showing that
  - Individuals with positive posts reduced post fewer positive words
  - Individuals with negative posts reduced post more negative words
- Withdrawal effect – users viewing fewer emotional posts were less expressive

## The FB study

- Discussion

- Results contrast with other studies suggesting that viewing positive posts has an adverse effect (references for these studies)
- First experimental evidence of emotional contagion
- Related work
  - Description of linguistic inquiry and word count tool and studies supporting its accuracy
  - Additional FB studies -- reference to article showing FB content effects voter turnout
- Limitations
  - Emotional content of FB posts do not necessarily reflect emotional status of the poster, but...
  - Effect sizes (changes) are small, but small effect sizes not negligible when social network is so large