Common problems in scientific manuscripts by Chinese authors and basic notes on statistical analysis

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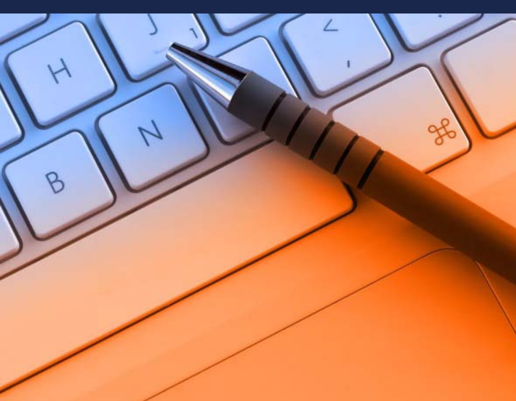

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Outline

- The basics of statistical analysis
- A brief introduction to Meta-analysis

- Common mispractices of Chinese authors in scientific writing

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- The basics of statistical analysis
- A brief introduction to Meta-analysis
- Common mispractices of Chinese authors in scientific writing

Q: Why talk about statistics at all?

A: Statistical analysis is a crucial part of scientific research, and key to data interpretation.

The basics of statistical analysis

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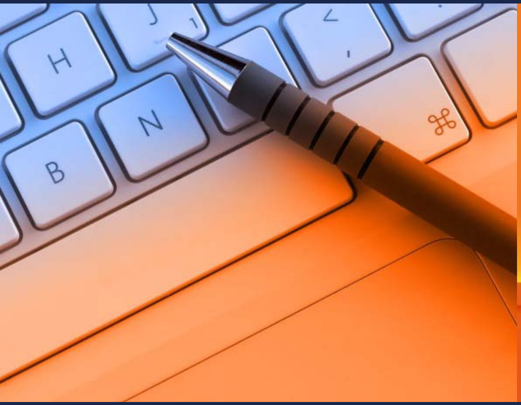


The basics of statistical analysis

- Introduction to statistics
- Hypothesis testing
  - Parametric and non-parametric tests
  - Multiple testing

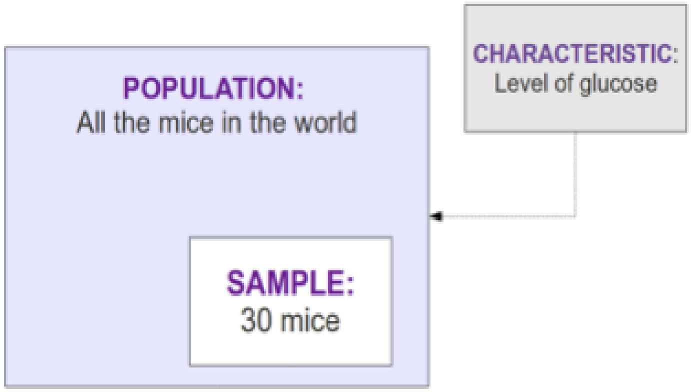
Partly adapted from Patricia Sebastían Leon
VII International Course of Massive Data Analysis

- What is statistics?

"Statistics is the study of the collection, organization, analysis, interpretation and presentation of data."

The typical goal is to extend the sample information to the population and to provide a measurement of the probability of the error

What is the normal glucose level in mice?



- **Variable**: Is the measure of the characteristic of interest for our study.
- **Population**: The universal set of all objects or individuals under study.
- **Sample**: A subset of the population.

"A Random Experiment is an experiment, trial, or observation that can be repeated numerous times under the same conditions. The outcome of an individual random experiment must be independent and identically distributed. It must in no way be affected by any previous outcome and cannot be predicted with certainty."

Tossing a coin

Lotto draw

A Random Experiment *is an experiment, trial, or observation that can be repeated numerous times under the same conditions. The outcome of an individual random experiment must be independent and identically distributed. It must in no way be affected by any previous outcome and cannot be predicted with certainty.*

Tossing a coin

Lotto draw

"A Random Variable associates a numerical value to each of the possible results of a random experiment"

- Discrete variables
  - *Nominal, Ordinal*
- Continuous variables
  - *Interval, Ratio*

- Discrete variable (cannot take on all values within its limits)

  Numeric Rating Scale (NRS-11) for patient self-reporting of pain

Rating	Pain Level
0	No Pain
1 – 3	Mild Pain (nagging, annoying, interfering little with ADLs)
4 – 6	Moderate Pain (interferes significantly with ADLs)
7 – 10	Severe Pain (disabling; unable to perform ADLs)

- Continuous variable (can take on all values within its limits)

  X = Gene expression level in a microarray experiment ={0.112, 3.2, 2.73, ...}

Probability distribution function

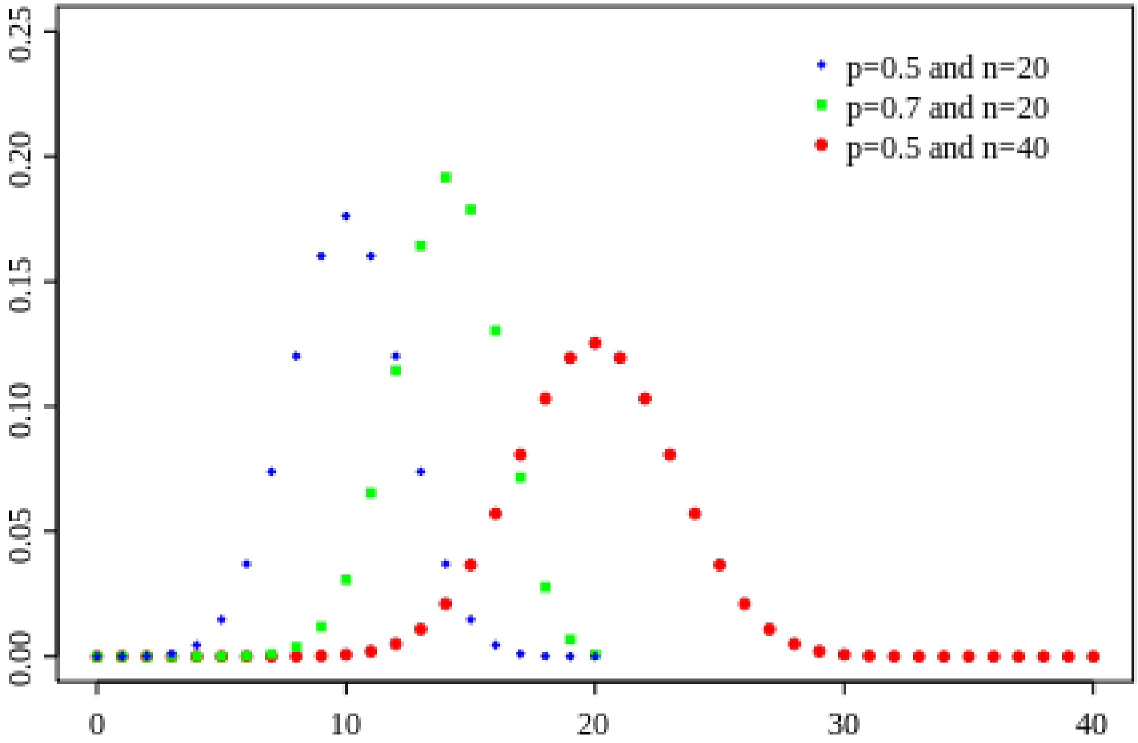
A Probability Distribution identifies:

- When the random variable is discrete it identifies the probability of each value of the variable.
- When the random variable is continuous it identifies the probability of the value falling within a particular interval.

Most commonly used statistical methods assume that the data can be described with a certain probability distribution function

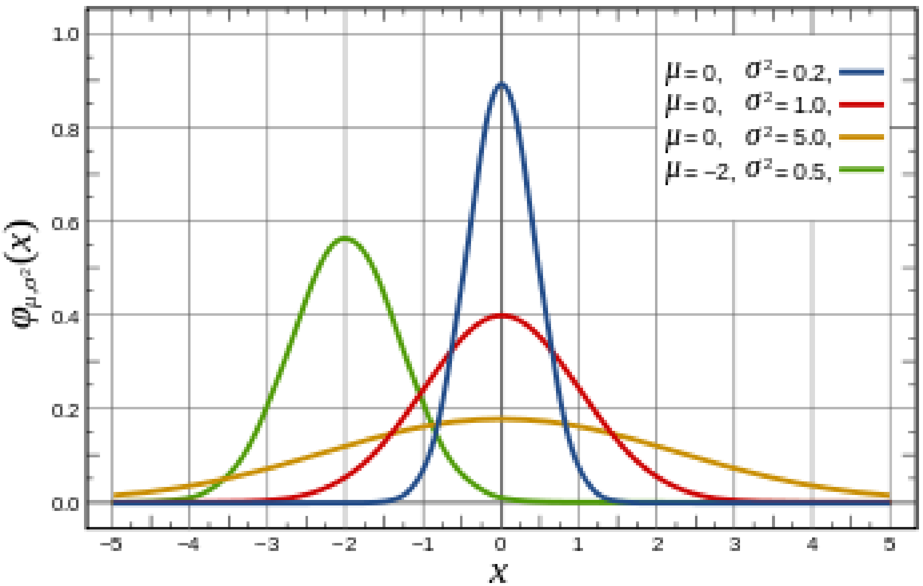
Probability distribution function

Binomial distribution (Discrete distribution) - *the number of successes in a sequence of n independent yes/no experiments, each of which yields success with probability p*



Probability distribution function

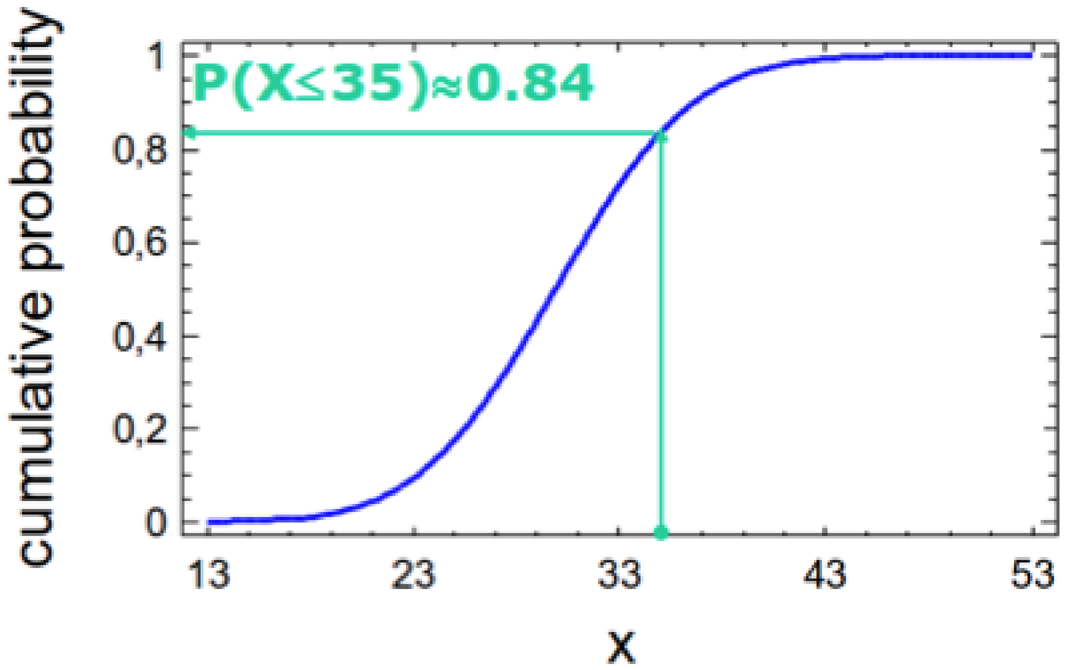
Normal distribution (Continuous distribution)



- It can be fully described with two parameters: mean and standard deviation

Cumulative distribution function

CDF describes the probability that a random variable X with a given probability distribution will be found at a value less than or equal to x.



Hypothesis testing

- Hypothesis testing is the use of statistics to determine the probability that a given hypothesis is true or not.
- In statistics, a result is called statistically significant if it has been predicted as unlikely to have occurred by chance alone, according to a pre-determined threshold probability, the significance level.

Steps

1 Formulating a hypothesis about the population

2 Random sampling

3 Summarizing the sample information (statistic)

4 Does the information support the hypothesis? What is the probability of making an error?

H_0: Null hypothesis

H_1: Alternative hypothesis

Usually the null hypothesis is a a general statement or default position of 'no effect' or 'no difference'

In other words, we start with a “no effect” hypothesis, and disprove it in order to demonstrate the existence of a potential effect.

Errors on hypothesis testing

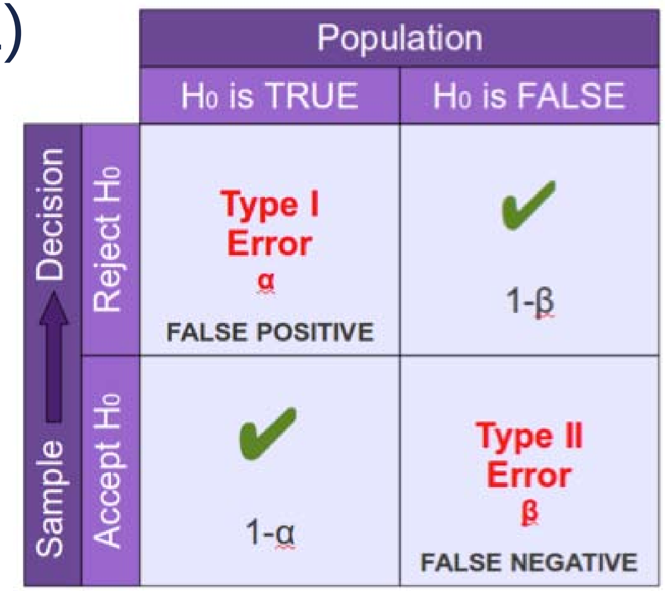
Sample → Decision		Population	
		H_0 is TRUE	H_0 is FALSE
	Reject H_0	**Type I Error** α FALSE POSITIVE	✔ $1-\beta$
	Accept H_0	✔ $1-\alpha$	**Type II Error** β FALSE NEGATIVE

Significance level = α = **P**robability (Type I error)

= P (Rejecting H_0 when H_0 is TRUE)

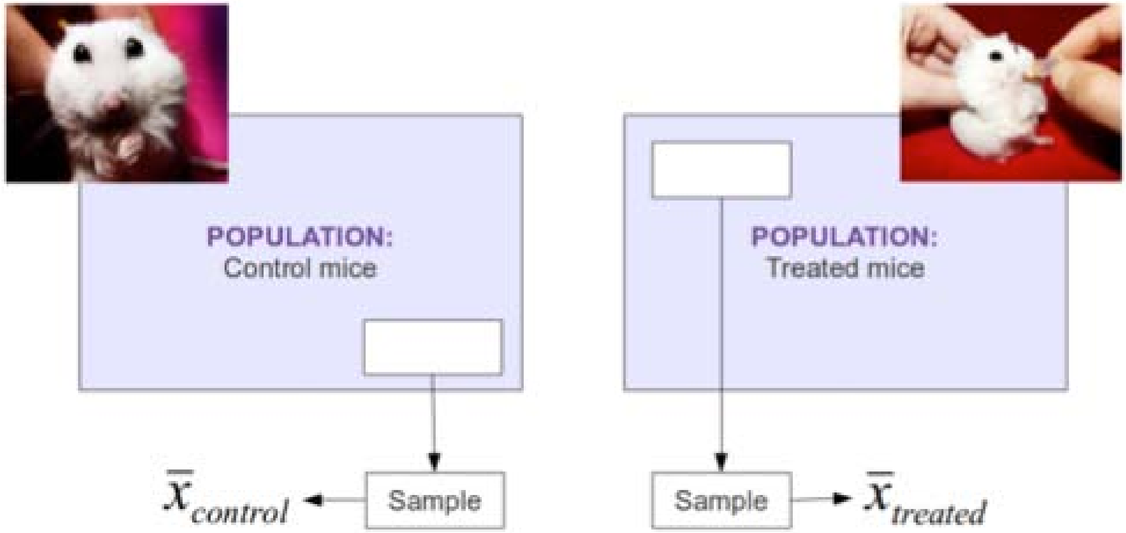
β = P (Type II error) = P (Failing to reject H_0 when H_0 is FALSE

Power = $1 - \beta$ = P (Rejecting H_0 when H_0 is FALSE)



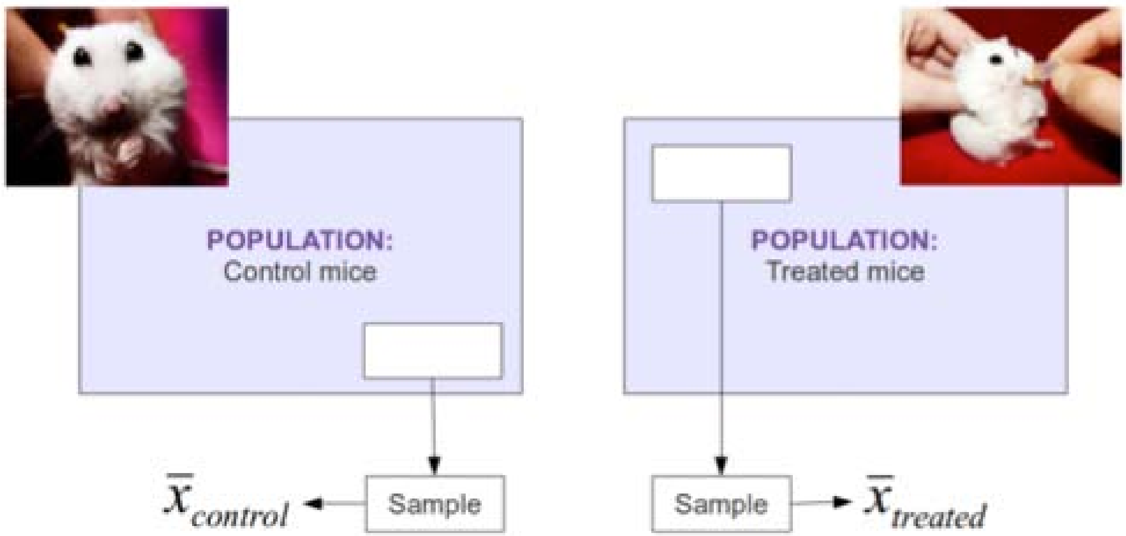
Example of a hypothesis test

We want to decide **if a certain drug can reduce the glucose level in mice**. We compare the average glucose levels of two groups of mice: the control group (untreated) and the group treated with a drug.



The null hypothesis is …

We are comparing the average blood glucose levels of two groups of mice: the control group (untreated) and the group treated with a drug.



The null hypothesis is $H_0 = \mu_{control} = \mu_{treated}$

(μ is the mean of the population)

Steps of hypothesis testing again

1. Formulate the null hypothesis (commonly, the observations are the result of pure chance).

   Formulate the alternative hypothesis (commonly, the observations show a real effect combined with a component of chance variation).
2. Identify a test statistic that can be used to assess the probability of the null hypothesis being not true.
3. Compute the *P*-value, which is the probability of wrongfully rejecting the null hypothesis.
4. Compare the *P*-value to an acceptable significance value α. If $P \leq \alpha$ (the observed effect is statistically significant), the null hypothesis is rejected, and the alternative hypothesis is accepted.

Standard deviation vs. standard error

- Standard deviation (SD, 标准差)

  describes how the population values disperse from the mean

- Standard error of the mean (S.E. or SEM, 标准误差)

  describes how the sample-mean disperses from the population mean

$$\mathrm{SE}_{\bar{x}} = \frac{s}{\sqrt{n}}$$

Do not confuse the two!

Confidence interval

- Confidence interval, a range of values that serve as estimates of an unknown population parameter, is closely related to statistical significance testing, but in theory is a different approach
- Confidence interval is associated with confidence level

- Some statisticians advocate use of confidence interval
- Statistical significance testing is a valid method!

Parametric and non-parametric tests

- Parametric test

  It is assumed that the data come from a type of probability distribution and makes inferences about the parameters of the distribution.

  Most well-known elementary statistical methods are parametric.

  - t-test
  - Analysis of Variance (ANOVA)

Parametric test: t-test

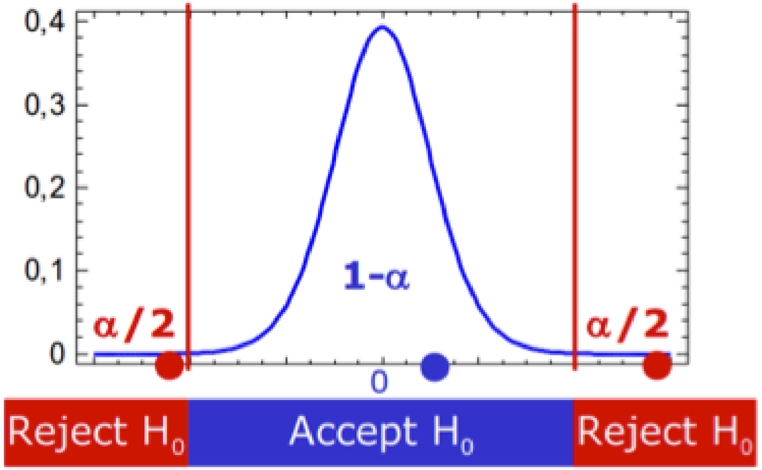
t-test: often used to determine if two sets of data are significantly different from each other (two-sample t-test)

Assumptions:

- Population data from which the sample data are drawn are normally distributed.
- The variances of the populations to be compared are equal.
- Independence of observations: this is an assumption of the model that simplifies the statistical analysis

Parametric test: t-test

t-statistic: $t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}} \sim$ Student's t (if H_0 is TRUE)



- A result is called significant if it is unlikely to have occurred by chance
- The p-value measures the significance of a result
- I recommend not saying "extremely significant"; just showing p-value would serve the purpose

Parametric test: ANOVA

ANOVA: a collection of statistical models used to analyze the differences between group means and their associated procedures

Assumptions:

- Normality
- Equality (or "homogeneity") of variances: the variance of data in groups should be the same.
- Independence of observations.

Parametric test: ANOVA

- One-way ANOVA is typically used to test for differences among at least three groups, and can be considered as generalized t-test.
- Repeated measures ANOVA is used when the same subjects are used for each treatment.
- Other more complex versions of ANOVA (e.g., multi-factorial analysis of variance) compares population means of several groups with multiple independent variables: great way to analyze the result of a factorial experiment

Parametric and non-parametric tests

- Non-parametric test

  No assumptions about the population probability distribution

  - Wilcoxon Rank-Sum test
  - Kruskal-Wallis test
  - Kolmogorov–Smirnov test
  - Fisher's exact test

Non-parametric test

Wilcoxon Rank-Sum Test: nonparametric equivalent of the two-sample t-test

Assumptions

- All the observations from both groups are independent of each other;
- The data are measured at least on an ordinal scale

When normality holds, the rank-sum test is nearly as efficient as the t-test.

Non-parametric test

Kruskal–Wallis one-way analysis of variance: nonparametric equivalent of one-way ANOVA

Assumptions

- Independence of observations;
- The data are measured at least on an ordinal scale

Non-parametric test

Kolmogorov-Smirnov test: used to determine whether two underlying distributions differ, or whether an underlying probability distribution differs from a hypothesized distribution.

Assumptions

- Independence of observations;
- The data are measured at least on an ordinal scale

It can be used to test for normality of the distribution

Non-parametric test

Fisher's exact test: used in the analysis of contingency tables (tables displaying frequency distribution of the variables).

	Men	Women	*Row total*
Dieting	1	9	*10*
Non-dieting	11	3	*14*
Column total	*12*	*12*	*24*

Does women diet more frequently than men?

H_0: Gender and dieting are independent

Assumptions

- Independence of observations, random sample

Fisher's exact test:

	Men	Women	*Row total*
Dieting	1	9	*10*
Non-dieting	11	3	*14*
Column total	*12*	*12*	*24*

Do women diet more frequently than men?

H_0: Gender and dieting are independent

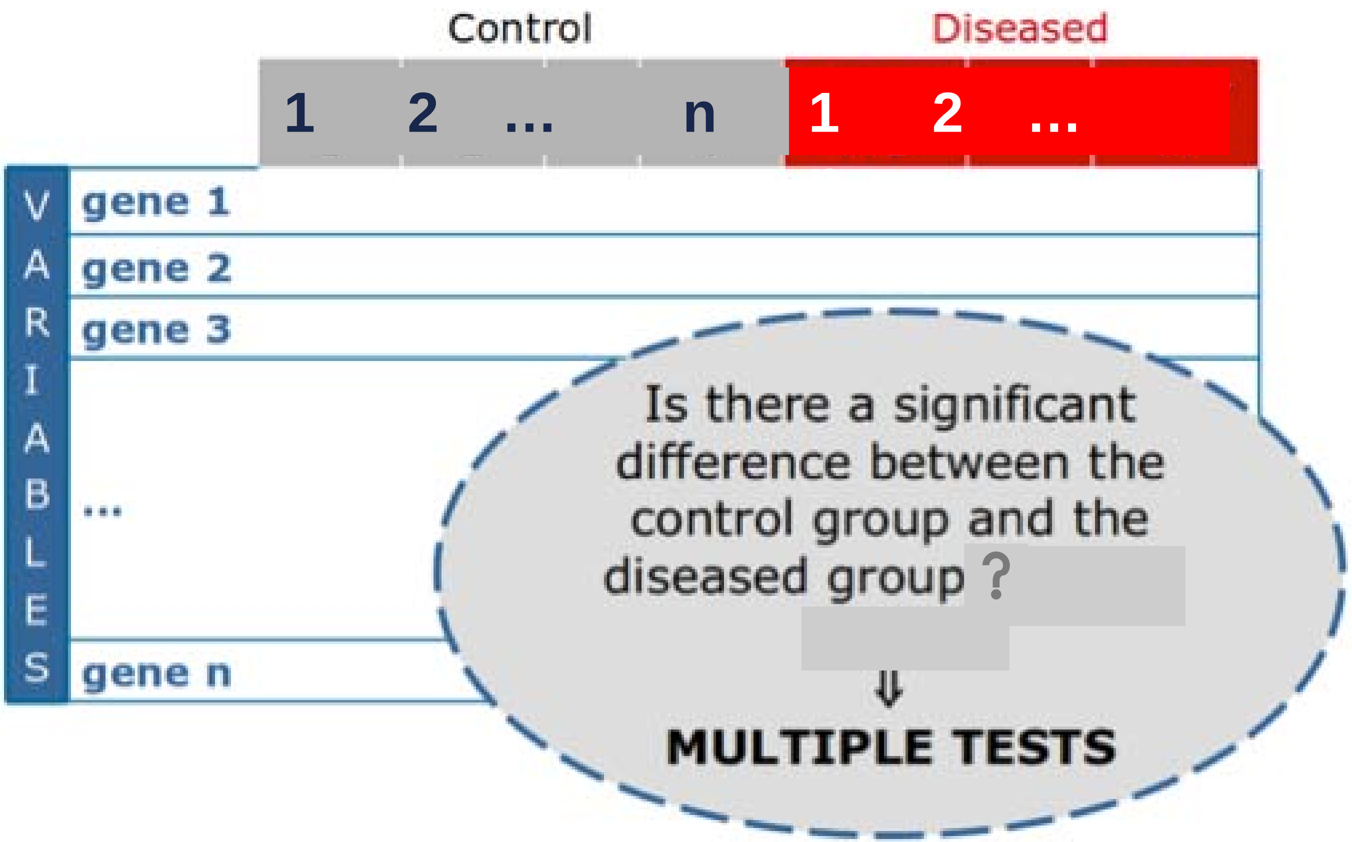
- Valid for all sample sizes (any of the cells are below 5, or below 10 when there is only one degree of freedom)
- When all cell frequencies are large enough, the chi square test can be used.

Parametric and non-parametric tests

- Know the characteristics of the data before choosing between parametric and non-parametric tests
- For rating scale data, non-parametric tests are recommended (note from Dr. Cabe)

Multiple testing

Simultaneous testing of several hypotheses



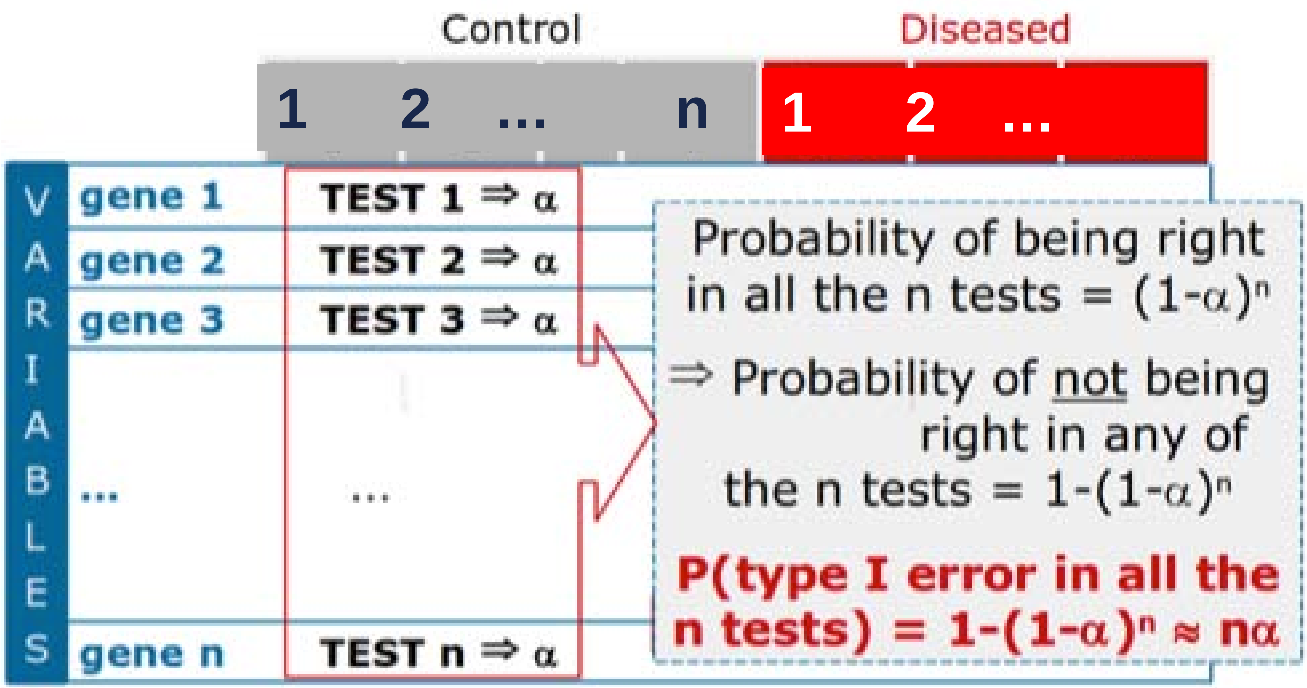
Multiple testing

Multiple comparison problem

“As the number of comparisons increases, it becomes more likely that the groups being compared will appear to differ in at least one attribute. In other words, the probability of the differences detected is purely due to chance is increased”

Multiple test correction

Multiple test correction adjusts p-values derived from each statistical test to correct for occurrence of false positives.



Multiple testing: Type of error control

	H_0 not rejected	H_0 rejected	Total
H_0 true	U	V Type I Error	n_0
H_0 false	T Type II Error	S	$n-n_0$
Total	n-R	R	n

- FWER (Family-wise error rate) = P(V > 0); strong control of FWER < α

- FDR (False discovery rate) = E(V/R): Expected proportion of type I errors among all hypothesis rejections – the proportion of false discoveries among the discoveries

Multiple testing: Type of error control

- To control for FWER is more stringent (reducing type I error to minimum), at the risk of failing to detect difference (less power)
- To control for FDR has more power in detecting difference, at the price of increased type I error

Multiple testing: Control for FWER

- Bonfferoni correction

FWER < α   (nα' < α → α' < α/n)

It reduces the allowable error α (p-value cutoff) for each test, dividing α by the number of tests n (α/n)

Multiple testing: Control for FWER

- Bonfferoni correction

  EXAMPLE:

  To obtain $\alpha = .05$ with $n = 10$ test, take the p-value cutoff $\alpha = .05/10 = .005$

- Modified Bonfferoni correction with improved power
  - Holm–Bonferroni method
  - Hochberg method

Multiple testing: Control for FDR

- Benjamini–Hochberg procedure

  Q = E(V/R), q-value (FDR analogue of p-value) should be below a threshold α

Multiple testing

- Multiple comparisons increase the probability of type I error and should be compensated for appropriate interpretation of data analysis.

- To choose what method to compensate for multiple comparison depends on the goal and the specific conditions of the experiments

Experimental design and statistical analysis

- **If a study is not designed well, then the results probably won't be very informative. Even the fancies statistical analysis may not be able to save the day.**

  (a hypothetical example of poorly designed experiment: all control mice tested full, all treated mice hungry)

- **Review the assumptions of the statistical analysis method you choose to make sure that none of the assumption is violated.**

Basic principles of experimental design

1. Randomization

   removing bias; basis for most statistical tests

2. Replication

   must define each step so that the next researchers may be able to replicate the study exactly the same way

3. Local control

   balancing (balanced arrangement of the treatments), blocking (grouping units similar to one another) of experimental units to remove external source of variation

4. Watch out for lurking, confounding factors!

Take home messages

- Careful experimental design is very important
- A hypothesis-driven experiment is in general more desirable than post-hoc analysis
- Independent sampling is the basis for valid statistical analysis methods
- Before running a statistical test, check if you have violated any of the assumptions

Textbooks for statistical methods

Statistical Methods

Third Edition (2010)

by Rudolf J. Freund, Donna Mohr, William J. Wilson

Non-parametric statistics for the behavioral sciences (2nd. ed.). *Siegel, S., & Castellan, N. J.* (1988). New York: McGraw-Hill.

How to select appropriate statistical test? By Jaykaran

Journal of Pharmaceutical Negative Results, Vol 1 | Issue 2

A brief introduction to meta-analysis

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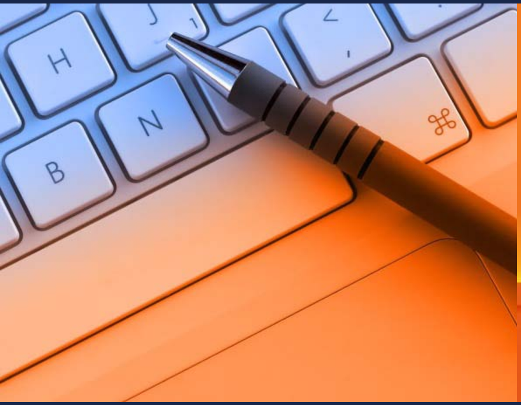


A Brief Introduction to Meta-Analysis

- Why do Meta-analysis?

Sometimes the estimate of a certain effect obtained from any single studies may not be accurate enough due to limited experimental condition (e.g., limited sample sizes). Meta-analysis is a proper method for combining these studies for a more accurate estimate.

- What is Meta-analysis?

“In statistics, a meta-analysis refers to methods that focus on contrasting and combining results from different studies, in the hope of identifying patterns among study results, sources of disagreement among those results, or other interesting relationships that may come to light in the context of multiple studies.”

To put it simply, meta-analysis is …

- A research on research
- The general aim of a meta-analysis is to more powerfully estimate the true effect size ("quantitative measure of the strength of a phenomenon") as oppose to the less precise estimate obtained from each individual study

  e.g., effect sizes based on means or distance between means, those based on "variance explained" (correlation coefficients), odds ratio (commonly used in case-control studies), relative risk (commonly used in randomized controlled trials and cohort studies)

In other words, meta-analysis is …

- A literature review with quantitative estimation of the magnitude of an effect size along with its uncertainty, and how the effect size differs between subjects, protocols, researchers
- The output is typically the weighted average of the common measure of the effect size
- The weight is in general related to the sample size of each individual studies (gives more weight to studies with more precise estimates)

Fixed effects model for meta-analysis

- Test of heterogeneity between studies (real differences between studies in the magnitude of the effect) using I^2 statistic (the percentage of variation across studies due to heterogeneity rather than chance)
- When *P* > .10 (the test has low power), the effect is considered homogeneous, and fixed-effects model is applied (traditionally, if *P* < .10, the “outlier” studies are excluded and heterogeneity test is performed again until *P* > .10)
- If the number of studies included is too small to accurately estimate heterogeneity, it may lead to a false homogeneity assumption

Fixed effects model for meta-analysis

- Assumptions: All included studies
  - Investigate the same population
  - Use the same variable and outcome definitions
  - The differences in the effect between studies are due only to sampling variation
- But these assumptions are rather unrealistic…

Random effects model for meta-analysis

- Assumption: there are real differences between all studies in the magnitude of the effect (heterogeneity)
- Two steps:
  - Inverse variance weighting (used in fixed-effects model too)
  - Un-weighting of this inverse variance weighting by applying a random effects variance component (REVC) that is simply derived from the heterogeneity (extent of variability in the effect sizes) of the underlying studies
- More data are required for random effects models to achieve the same statistical power as fixed effects models

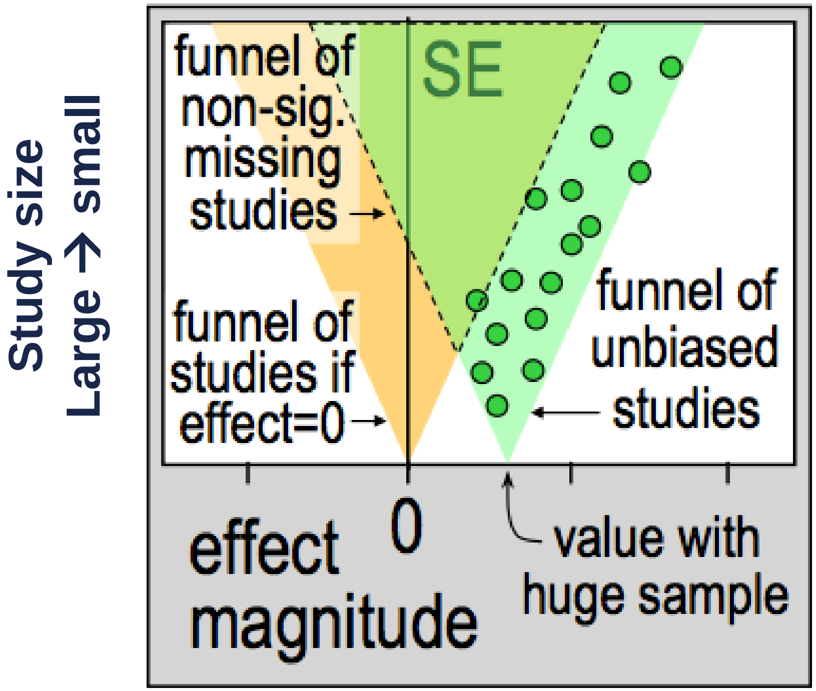
Pitfall of meta-analysis

- Publication bias (file drawer problem)

  Studies that reported significant difference are more likely to be published, whereas studies showing negative results or insignificance were either never submitted or rejected for publication

To examine publication bias

- Funnel plot – study size vs. effect size



It is recommended to use standard error as a measure of study size

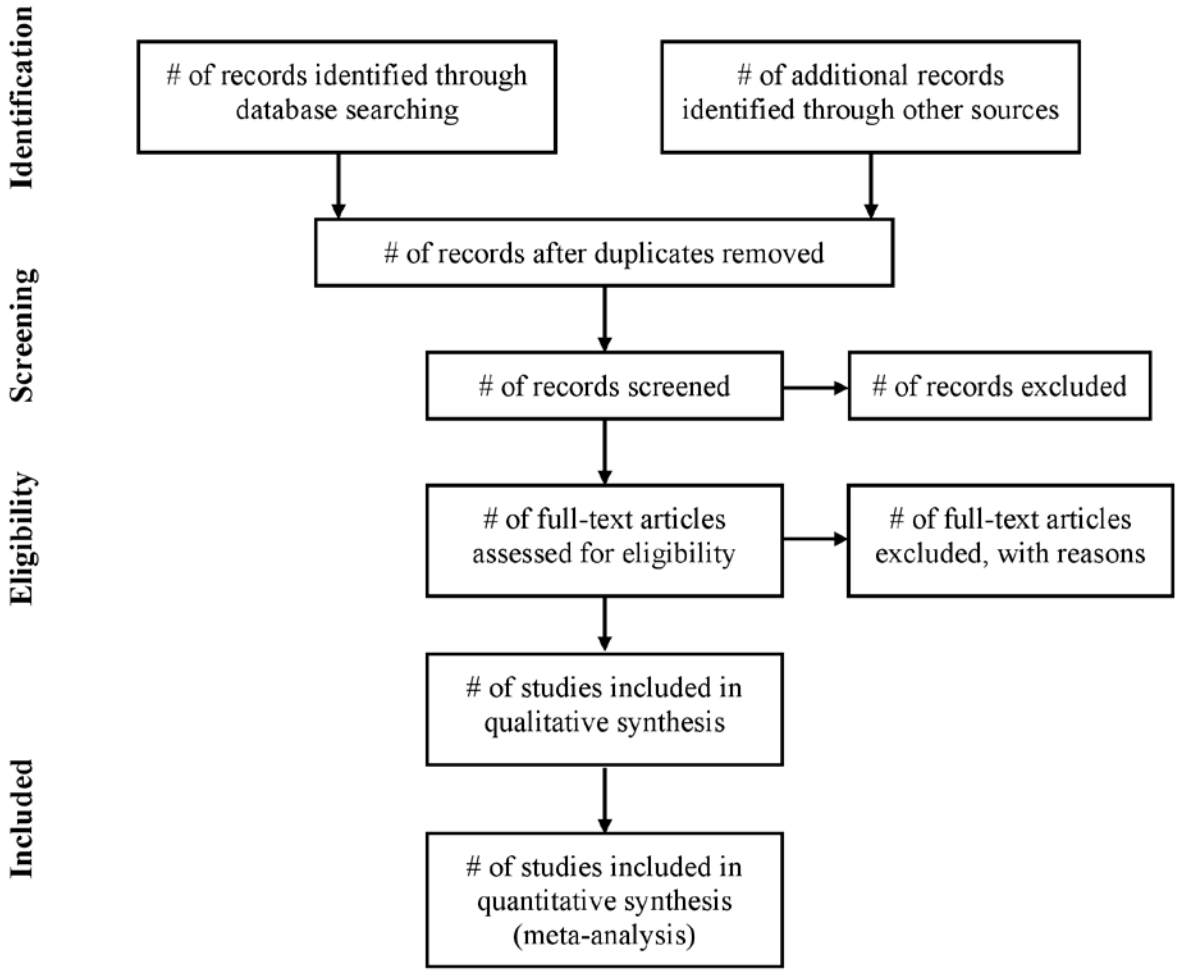
Steps in a meta-analysis

1. Formulate the problem (finding an interesting effect)
2. Search the literature
3. Select studies ('incorporation criteria')
   - Design (e.g., only randomized controlled trials)
   - Population (e.g., only lung cancer patients)
   - Treatment (e.g., only acute effects)
   - Decide whether unpublished studies are included to avoid publication bias

The health care discipline has recognized the importance of standardizing the selection process of meta-analysis and formulated an evidence-based minimum set of items aimed at helping authors to report systematic reviews and meta-analyses (PRISMA)

Steps in a meta-analysis

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) *Flow diagram*



Steps in a meta-analysis

4. Record effect magnitudes and convert them into values on a single scale of magnitude, for example:
   - Differences (discrete data)
   - Means (continuous data)
   - Hedges' g (a popular standardized summary measure of continuous data)

5. Select a meta-regression statistic model (random-effects model is generally recommended over fixed-effects model)

Reporting meta-analysis

- Reports of meta-analysis parallel reports of other studies, and the general structure of the manuscripts are similar

- PRISMA also contains a comprehensive checklist of all the components that need to be included in meta-analysis report

Common mispractices of Chinese authors in scientific writing

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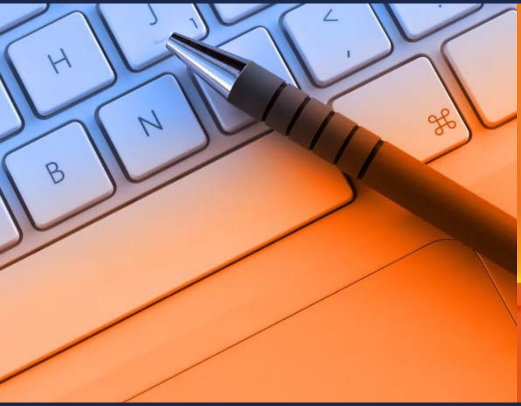

Writing problems common to Chinese authors

- These are problems that I have summarized over the experience of personally translating/providing scientific editing for ~400 manuscripts written by Chinese authors
- These manuscripts are in the fields of biological sciences, medicine, geology, archaeology, physics, chemistry, mathematics, computer science, economics and social sciences

CLARITY IS OF ESSENCE

- A typical Chinese writing style
  “微言大义” “春秋笔法”
  small, subtle words with big meaning; indirect writing
  Expects the readers to think about the unspoken, hidden meaning and to read between the lines

- Great for creative writing, but big no-no for scientific writing!

CLARITY IS OF ESSENCE

- The goal of scientific writing is to clearly convey to the readers the precise information about your study, your experiments and findings
- The most important task is to make the readers understand everything exactly as it is. There is no room for guessing.
- When there is a genuine potential issue, you can't simply avoid it by being vague.

A few examples of being vague

- "等"

  Example 1: "对于弱势群体公平性 指标,分别有老年人、小孩、残疾人、低收入人群等4 种群体;"

  There are exactly four groups described here. So use "共" instead, not "等."

  -> 对于弱势群体公平性 指标,分别有老年人、小孩、残疾人、低收入人群共4 种群体

  Example 2: "一直服用氯氮平及利培酮等药物治疗"

  -> "一直服用氯氮平及利培酮进行药物治疗"

  What were the other drugs exactly?

A few examples of being vague

- "更"

  "研究表明,种群的内部结构可以更好的反映种群空间分布对环境的响应特点"

  Better than what?

  In Chinese, it sometimes is OK to use "更" without specifying "than what." But in English, it is almost always confusing if the "than what" part is left out.

A few examples of being vague

- "A是一个更好的指标"

  Better in what aspect? More sensitive? More accurate? Faster?

  Be specific. Never leave room for guessing.

- "较好，" "较强，" "较可靠"

  It's all right to use "较(relatively)" sometimes, but I feel that it is used more often than necessary.

A few examples of being vague/cliché

- “为。。。提供科学依据和理论指导，” “具有深远的意义”

  The underlying message is vague and conveys no useful information. **The facts are much more important than impressive adjectives**.

  Cut down these adjectives. Instead be more specific describing what the facts (contributions) are.

Another phrase used too often (cliché)

- "研究热点"

  There is nothing wrong saying that *per se*. But it says nothing about the scientific value of the study, and almost sounds like that it is because a lot of people are doing this that I decided to do it.

  I would encourage you to get rid of this type of phrases, and this type of thinking when writing a scientific manuscript. Think about and stress the scientific question itself, instead of using clichés.

A couple of tips to be absolutely clear

- If a sentence is too long, try to break it down to several short sentences.
- Properly used conjunctions are very helpful, but improperly used conjunctions may cause confusion.

Clarity is the one thing that should never be compromised in scientific writing.

Conciseness is also very important

- Redundancy is rather common

  "研究磨粒的不同冲击速度对光学玻璃磨削的影响规律, 因光学玻璃等硬脆材料断裂问题比较复杂, 为避免引入不确定因素, 采用磨粒冲击速度这一单因素去考察和研究光学玻璃磨削影响规律. "

Conciseness is important

- Repeated sentences in different parts of the manuscripts are not uncommon. Sometimes these sentences are written slightly differently but mean the exact same thing; more often they are exactly the same!
- Too much “copying and pasting?”

Improper quoting

- This is a serious issue (plagiarism)!
- When citing others' finding, or writing the method section, it is NEVER OK to directly quote several sentences, a whole sentence or even a long part of a sentence (without quotation marks) from another published paper
- **Always write in your own words**

Writing in your own words

- Sit down, breathe, think about the message you would like to convey, and start writing
- It is OK to write something that does not look very elegant or organized in your first attempt. You can always modify it later.
- It is the content of your scientific work that matters most

Writing in your own words

- When you need to cite a finding, either write it in your own words, or paraphrase the original sentence(s).
- But do check your writing and make sure that every sentence makes good sense

  “XXX提出要通过分析目前全球碳排放的压力及挑战, 指出要推进碳管理。“
- When revising, aim for solid logical structure of each sentence and coherence of the entire article.

Abstract

- Depending on the journal, the abstract may be structured or unstructured
- Some journals require *P* value to be stated in the abstract
- Try to avoid very similar sentence structures in the methods and result section in the structured abstract

Introduction

- Background (importance of the issue, what has been learned)
- Rationale for conducting the current study
- Avoid writing duplicate sentences in the introduction and the discussion sections
- In general, the introduction is about what led you to conduct the study, the discussion is about what your results mean and how they compare to other findings

Introduction

- If a phrase is to be repeated many times in the text, spell out the phrase the first time it appears followed by its acronym in parenthesis, and only use the acronyms afterwards
- But don’t use an acronym without spelling out the full name the first time it appears (it’s probably OK for commonly used acronyms such as PCR, DNA)

Introduction (social sciences)

- Some systems and phenomena are unique to China. Every Chinese understands them, but most western readers do not. Explain them. For example:
  - Household registration system (户籍制)
  - Migrant workers (外来打工人员）
  - Doctor-patient conflict (医患矛盾）

Again, the purpose of scientific writing is to convey information (experiments or theories). It is crucial that others understand what you write.

Methods

- Again write everything in your own words, even the most “boring” details
- For reagents/instruments/software used in the study, typically the journal would require information on the location of the manufacturing company to be included in parentheses. For example, in the U.S., it would be company name, city, state and country (Sigma-Aldrich Corp, St. Louis, MO, U.S.).

Methods

- Explicitly state the grouping of the subjects – it's absolutely critical information!
- Be careful about the numbers and make sure they add up

Results

- Instead of bluntly stating the analysis results without any explanation, try to provide a brief description as to why this particular experiment and/or analysis was performed at the beginning of each section.

Results

- Figure legends should be self-explanatory. In other words, the information contained in the figure legends should allow the readers to get the gist of the figure without going back to the text; at the same time, the text should also clearly explain the result in the figures. These two parts may partially overlap and complement each other (but do not to use the exact sentences!).
- Also true for table captions.

Discussion

- There is no need to repeat what has been stated in the introduction. Instead, focus on interpretation of the data, comparison with other findings and the significance of the current finding (in specific details as to the scientific contribution, not “providing theoretical guidance and scientific basis”)

Discussion

- In citing references, depending on the journal, either use the format "(author name, year of publication)", or a bracket with reference number in it "[X]", but not both
- Be tactful about the pitfalls

Conclusion and acknowledgements

- Try not to directly copy and paste from other parts of the manuscript (e.g., abstract)
- Typically, the acknowledgements section is put at the end of the text (people who assisted or financial support), not before.

Formatting according to journal guidelines

- Title (word/character limit)
  - Sometimes a running title is required
  - The title page typically includes the names, affiliations and addresses of all authors
- Abstract (word limit; structured or unstructured)
- Text (word limit)

  Again in general please be concise. Even for long articles, the length should come from the comprehensive content, not duplicate sentences (or sentences that mean the same thing being repeated over and over)

Formatting according to journal guidelines

- Figures
  - Please make sure the dots, lines and labels in the figures are large, thick enough for easy viewing
  - Please add error bars when possible
- Tables

  In general, the total number of figures and tables is limited. Sometimes, multiple tables can be easily combined into one.

Cover letter

- First paragraph: state that you wish to submit the manuscript (title) to the journal (name)
- Second paragraph: explain the importance of your work and the main findings in words that can be easily understood – the editor reading the cover letter may not have worked in the exact same research field.
- Third paragraph: state conflict of interest, that the manuscript has never been published or is being considered for publication anywhere else
- Make sure leave the contact information of the corresponding author.

Online submission

- Typically the corresponding author, or one of the authors should create an account in the submission system and make the online submission.
- The name, affiliation, address, email address of each author. Be careful about the order of the authors.
- Selection of the field and subfield of your work
- Selection of preferred and non-preferred reviewers
  - This can be tricky, but in general exclude all potential competitors, especially those who don't have a great reputation in this matter

Online submission

- Typically, you upload the following files separately: cover letter, manuscript (with tables and figure legends), figures (jpeg, png, tiff files, one file for each figure).

- A pdf file will be generated, waiting for your approval. If all looks fine, check the box and proceed with the submission.

Response letter

- In general, Chinese authors tend to be overly polite in response letters. It is not necessary to keep thanking the reviewers and the editors for their valuable comments and suggestions over and over.

- If a comment is unfair, or the reviewer has made a mistake, point it out. No need to be rude, but you must send that feedback to the editor, and make your point clear!

Happy writing, scientists!

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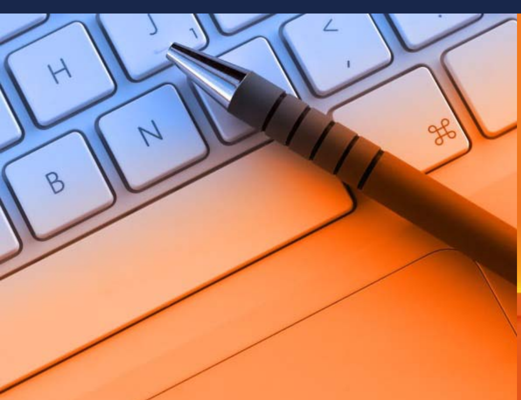

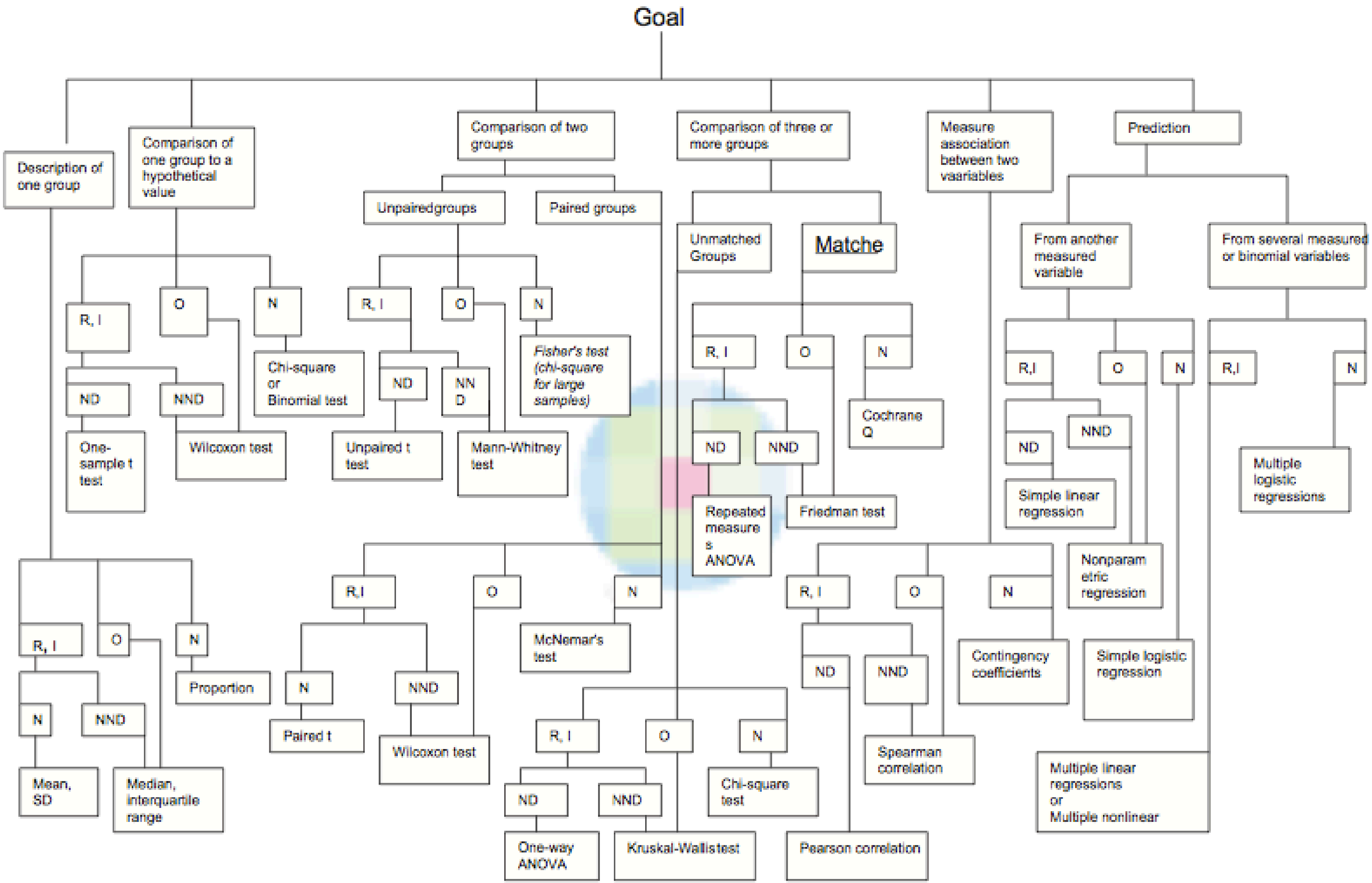

R, I = Ratio and Interval data O= Ordinal data N = Nominal data

N = Normal distribution NND = Non normal distribution

Figure 1: Flow chart for selection of appropriate statistical tests

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