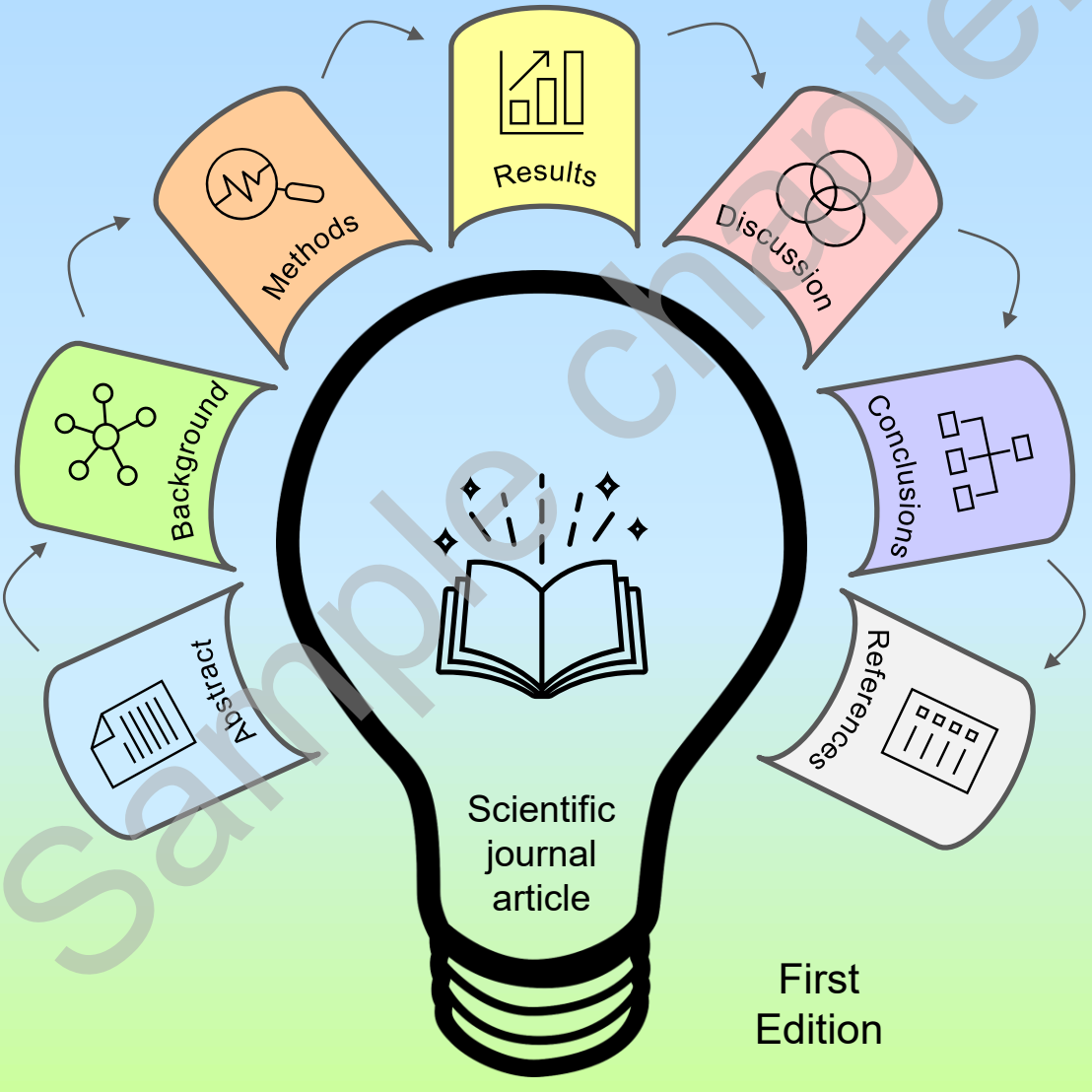
COMPASS GUIDE:

How to Write Scientific Journal Articles



First Edition

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Compass Guide Research Training
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To my Dream Team
– my husband Philip McKague and children Adriana and Oliver McKague –
for their love, support and inspiration
and for giving me the space and time to keep chasing my dreams…

AGILE Research Ltd., 3/43 Cooper Street, Karori, Wellington, 6012, New Zealand

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No artificial intelligence (AI) tools were used in creation of the content of this publication.

3.4 Results

The results section should present research findings clearly and in a logical order. It is essential that presented results are directly related to your research question(s) and objective(s). The results section should present data for all measurements described in the methods.

Research results are usually presented using a combination of text, tables and figures.

However, presentation of results varies across disciplines and by research methodology.

For example, quantitative research results are largely presented using tables and figures.

In contrast, results of qualitative research may be presented in text without or with limited use of tables and figures but illustrated with quotations from research participants.

In general, figures and graphs are used to emphasise key findings and/or present complex information.

Know the requirements of your discipline and prepare your results section accordingly.

YouTube video link

How to Report Research Results

The AGILE Research YouTube Channel
www.youtube.com/@agileresearch

It is important to keep in mind that scientific journals usually allow a limited number of tables and figures to be included in the article. You will need to refer to the requirements of the specific journals when preparing your article for publication and limit the number of tables and figures accordingly.

This section provides detailed guidance and a checklist for presenting research results in text, tables and figures.

This section also includes recommendations for presenting results using images and infographics.

Let's have a closer look.

Various Ways of Presenting Research Results

Text | **Tables** | **Figures** | **Images** | **Infographics**

Meeting health behaviour guidelines. In both samples, few adolescents met health behaviour guidelines (Table 2). Compared to S1, a greater proportion of S2 adolescents met guidelines for physical activity (16.7% vs 23.1%; p<0.001) and screen time (13.3% vs. 18.3%; p<0.001) while no significant difference was observed for fruit and vegetable intake (29.6% vs. 27.0%; p=0.322) (Table 2) and all three health behaviours combined (Figure 2).

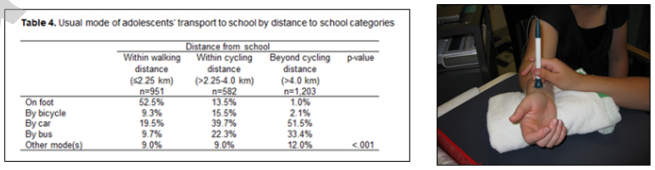
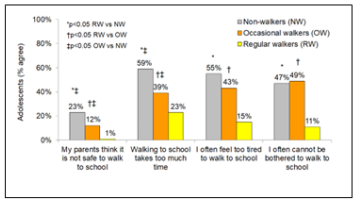
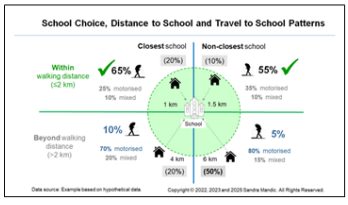


Table 4. Usual mode of adolescents' transport to school by distance to school categories

	Distance from school			
	Within walking distance (≤2.25 km) n=951	Within cycling distance (>2.25-4.0 km) n=582	Beyond cycling distance (>4.0 km) n=1,203	p-value
On foot	52.5%	13.5%	1.0%	
By bicycle	9.3%	15.5%	2.1%	
By car	19.5%	39.7%	51.5%	
By bus	9.7%	22.3%	33.4%	
Other mode(s)	9.0%	9.0%	12.0%	< 001





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Guidelines for Presenting Results in Text

Use text to summarise the main findings.

Whenever possible, supplement text with other ways of presenting results in your article such as tables, figures, graphs and images.

Avoid presenting the same data in multiple ways (in text, tables and figures). If data points are already presented in a table format, summarise findings in text without including those data points in the text as well.

Findings with only a few data points may be described in text, rather than creating a new table or figure.

Do not discuss results, study strengths or limitations in the results section (unless required by the journal you are submitting your article to).

The results section should be written using the past tense.

Analysis of an Example

Let's have a look at the example of the text description of research results on this page.

Findings are summarised in text, referring a reader to relevant tables and figures for more information usually after first mention (1). Key findings are emphasised in text (2). In this example, the second paragraph presents actual data extracted from a table (relevant table is not presented as part of this example) for one of key findings to add more detailed context and further emphasis (2).

Results of statistical analyses are described in text, with the actual p-values presented where appropriate (3).

In this example, the description of results is succinct, clear and written using the past tense. Subheadings are used effectively to structure the presentation of results.

Example of the Text Component of a Results Section from a Scientific Article

1 ***Sociodemographic characteristics.*** *Data from 2,085 adolescents were included in this analysis: 1,264 adolescents from 12 schools for study 1 in 2014/15 (S1) and 819 adolescents from 11 schools for study 2 in 2021/22 (S2) (Table 1). Gender, ethnicity, neighbourhood level deprivation and self-reported health differed between S1 and S2 participants (Table 1). The proportion of males, adolescents of Māori and 'other' ethnic groups was higher in S2 compared to S1, while the proportion of New Zealand European adolescents was higher in S1 compared to S2. Adolescents lived in households with more vehicles, desktop and laptop computers and fewer televisions and game consoles on average in S2 compared to S1. Differences in neighbourhood level deprivation and self-reported health were also observed between the studies appearing to indicate a slight deterioration in the latter case.*

2 3 ***Meeting health behaviour guidelines.*** *In both samples, few adolescents met health behaviour guidelines (Table 2). Compared to S1, a greater proportion of S2 adolescents met guidelines for physical activity (16.7% vs 23.1%; p<0.001) and screen time (13.3% vs. 18.3%; p<0.001) while no significant difference was observed for fruit and vegetable intake (29.6% vs. 27.0%; p=0.322) (Table 2) and all three health behaviours combined (Figure 2). Average daily screen time outside school was lower on weekend days (6.9±3.5 vs. 6.1±3.6 hours/day; p<0.001), but higher on weekdays (5.0±2.9 vs. 5.6±2.9; p<0.001) in S2 compared to S1. A higher weekly frequency of consuming sweets and a lower frequency of consuming sugary soft drinks and fast food were found in S2 versus S1 (Table 2).*

3 *Compared to adolescents who did not meet any of the health behaviours guidelines for physical activity, screen time or fruit and vegetable intake, the proportion of adolescents who met two or three guidelines were significantly higher at S2 compared S1 (p=0.006; Figure 2), whereas the difference between adolescents meeting one and no guideline did not reach statistical significance (p=0.071; Figure 2).*

Reprinted and adapted from Mandic S, Khan A, García Bengoechea E, Spence JC, Coppell K, & Smith M. (2024) Physical activity, screen time and dietary behaviours in New Zealand adolescents prior to and following the onset of the COVID-19 pandemic. *BMC Public Health, 24*, 188. https://doi.org/10.1186/s12889-024-17688-7 under Creative Commons Attribution 4.0 License (CC BY 4.0).

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Guidelines for Presenting Results in Tables

Tables are more effective than text for presenting a large amount of numerical data.

All tables should be clearly presented, properly labelled and self-explanatory. Include measurement units for each variable, if applicable. For table with many variables, subheadings could be used within the table to indicate groupings of variables.

For completeness of presented information, spell out all abbreviations under the table.

Make sure that font used in tables is readable.

If possible, avoid large tables that cannot fit on a single page of a published journal article. Consider splitting large tables into one or more smaller tables. Alternatively, consider presenting only selected key information in tables and include additional information to be published as supplementary material if journal policies allow publication of supplements.

Number tables consecutively, include a short title and refer to each table in the text.

Follow the journal's guidelines for formatting tables and comply with the maximum allowed number of tables and figures within the article.

Ideally, use tables when appropriate and mix them with figures for variety.

Analysis of an Example

Let's have a look at the example of a table on this page. In this example, survey data are presented for three study groups.

Research variables (survey items in this case) are presented in rows (1). In this example, measurement units are included with the presented data. Subheadings are used to indicate groupings of variables (2).

Study groups and the number of participants in each study group are presented in columns (3). A brief definition of the study groups is provided under the table (4).

Results are presented within the table (5) together with the results of statistical analysis (6). Additional relevant information is provided under the table (in this case, letters/symbols used to indicate statistically significant differences between the groups) (7).

Table number and a short title are included above the table (8).

If possible, consider converting some of your tables into figures or infographics to increase the effectiveness of communicating your research findings. Take on the challenge!

Table 2. Comparison of parental perceptions of cycling to school across three distance-to-school categories

	Distance parents lived from their child's school			
	Walkable distance n=335	Cyclable distance n=278	Beyond cyclable distance n=349	p-value
Perceived importance				
Cycling to school is important	56.6%	63.0%	65.3%	.560
Social support				
As parents, we encourage our child to cycle to school	34.6% [c]	35.0% [c]	20.9% [a,b]	.007
Friends encourage my child to cycle to school	37.4% [b,c]	29.7% [a,c]	19.7% [a,b]	.012
Personal barriers				
Cycling to school takes too much time	3.1% [b,c]	19.9% [a,c]	62.5% [a,b]	<.001
My child does not want to cycle to school	63.2%	72.1%	65.4%	.350
Environmental barriers				
It is too far for my child to cycle to school	2.7% [b,c]	22.8% [a,c]	82.4% [a,b]	<.001
There are no cycle paths along the school route	40.8%	42.2%	45.0%	.124

[a] p<0.05 versus walking distance; [b] p<0.05 versus cycling distance; [c] p<0.05 versus beyond cyclable distance.

Note: Definition of distance to school categories: walkable distance (≤2.0 km), cyclable distance (>2.0 km to ≤4.0 km) and beyond cyclable distance (>4 km).

Note: This example uses hypothetical data.

See text for explanation of each numbered item on this table.

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Guidelines for Presenting Results in Figures

Use figures and graphs to emphasise key findings of your research. Well-designed figures and graphs are more effective visual aids than text and tables.

Figures can be used to present both numerical and text information whereas graphs are usually used to present numerical data only.

When designing graphs, provide a description of variables presented on the x-axis and y-axis and include measurement units, if applicable.

Spell out all abbreviations on the figure or in the notes included below the figure title.

It is essential to design colour-coordinated figures and graphs. Ensure sufficient contrast between colours used to represent different data, categories or groups. As a general rule, avoid using green and red colours on the same figure or graph.

Figures and graphs can also be supplemented by text explanations or additional graphics such as symbols and images.

Microsoft Excel and Microsoft PowerPoint work well for creating figures in most cases. You could also use Google Sheets and Slides.

Analysis of an Example

Now let's have a look at the example of a figure on this page.

In this example, a bar graph presents results for four survey questions (1) across three different groups of study participants (2).

This figure also indicates the results of statistical analysis of comparisons between the groups (3).

A text box included within the figure provides information about symbols used to indicate statistically significant differences between specific study groups (3).

A description of variables is presented on both x-axis and y-axis and includes measurement units on the y-axis (4).

Abbreviations are spelled out in the legend (5).

Figure title is included below the figure (6).

When designing figures for a scientific journal article, ensure that the font used in figures is sufficiently large to be legible in the published version of your article.

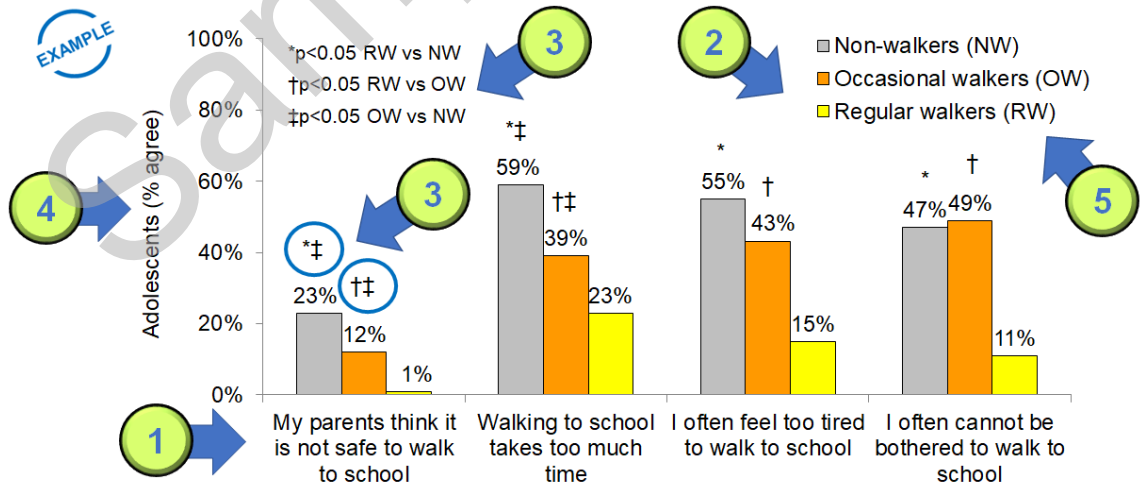

Figure 3. Comparison of adolescents' perceptions of walking to school among non-walkers, occasional walkers and regular walkers

Note: This example uses hypothetical data.
See text for explanation of each numbered item on this figure.

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Use of Images and Infographics to Showcase Research Findings

Images

Images are worth thousands of words and can also increase the effectiveness and appeal of your article. Images are particularly powerful for showing specific research procedures and showcasing creations made during the research process. If applicable, include relevant images in your article as figures. If including images, ensure that you do not breach copyright.

Infographics

The results section presents an opportunity to be creative. You can take your presentation of the research results to the next level by creating and incorporating infographics.

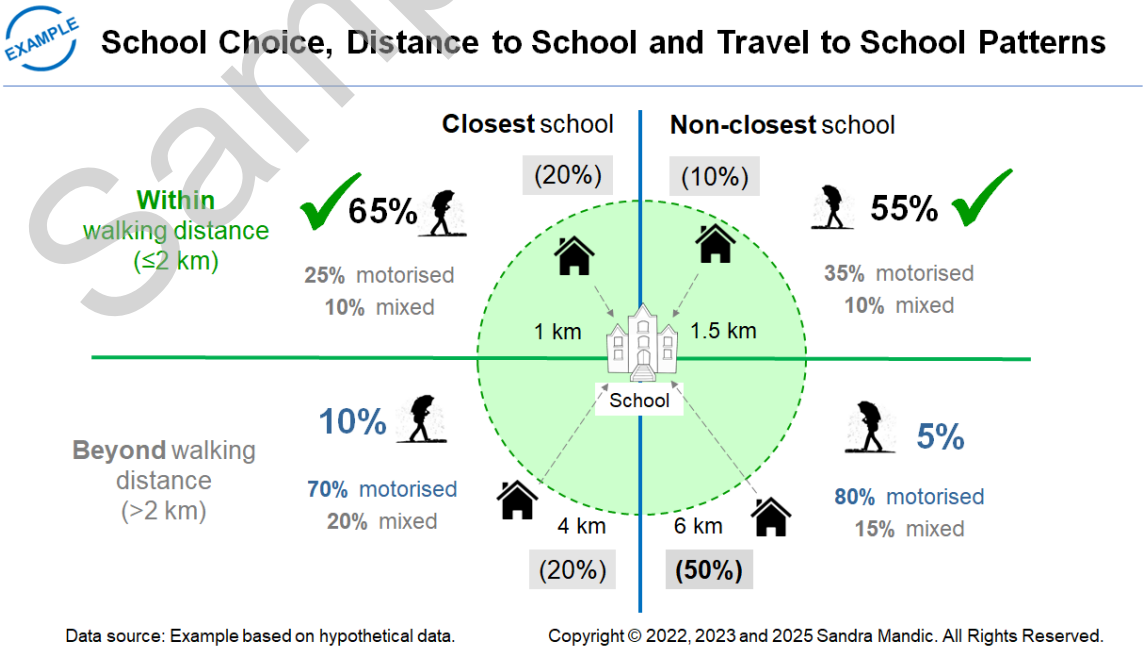
An infographic is a visual presentation of information or data. Well-designed infographics are an effective tool for communicating complex information in an easy-to-understand way.

You could create infographics by combining icons, symbols, shapes and vector graphics with short phrases and/or numbers. Include only text that is necessary.

Microsoft PowerPoint works well for creating simple infographics. Alternatively, you could seek help from a graphic designer – if such help is available and you have funding for such expenditure.

More detailed guidance for creating infographics is included in Dr Sandra Mandic's book Compass Guide for Research Project Management.

Example of an Infographic Summarising Research Findings



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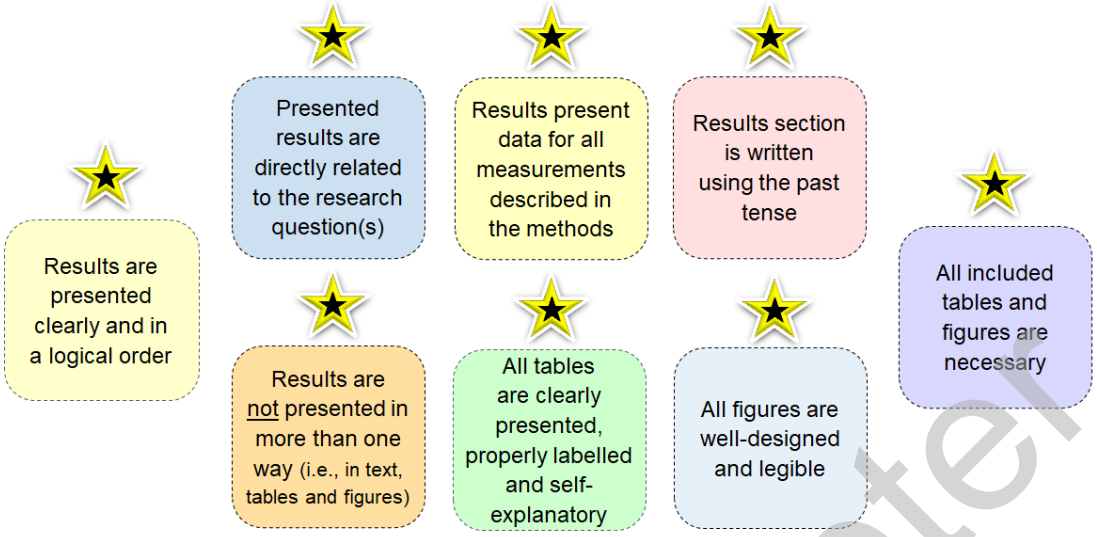
Results Section: What Good Looks Like



Compass Guide Checklist for Writing the Results Section

✓	Results are presented clearly and in a logical order
✓	Presented results are directly related to the research question(s)
✓	Results are reported for all outcome measures described in the methods section
✓	Results section contains an appropriate combination of text, tables and figures
✓	The same data are **not** presented in multiple ways (in text, tables and figures)
✓	The text summarises main findings and refers to appropriate tables and figures
✓	All tables and figures are clearly presented, legible, properly labelled and self-explanatory
✓	Tables and figures report statistical significance of research results, if applicable
✓	Decimal places are used consistently in all tables
✓	Measurement units are provided for each variable
✓	All abbreviations are spelled out under tables and figures, if applicable
✓	Figures are used effectively for emphasising main research findings
✓	Both x-axis and y-axis are labelled on all figures and graphs, if applicable
✓	All tables and figures are necessary
✓	Subheadings are used effectively throughout the results section
✓	Results section is written using the past tense

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