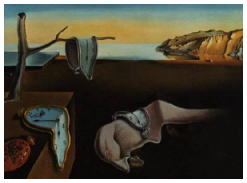

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Making, Updating, and Querying Causal Models using `CausalQueries`

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Abstract

A guide to the R package `CausalQueries` for making, updating, and querying causal models

Keywords: causal models, stan, bayes.

1. Introduction: Causal models

- Embed the *methods* and the *software* into the respective relevant literature.
- For the latter both competing and complementary software should be discussed (within the same software environment and beyond), bringing out relative (dis)advantages. All software mentioned should be properly `@cited`'d. (See also Using BibTeX for more details on BibTeX.)

Leadning about causal models…

In R, …

The strength of `CausalQueries` The limitation of `CausalQueries`

2. Models and software

Nodes and nodal types

3. Making models

Simple illustration

```
R> model <- make_model("Z -> X -> Y <-> X")
```

3.1. Graphing

Once defined the model can be plotted:

```
model |> plot()
```

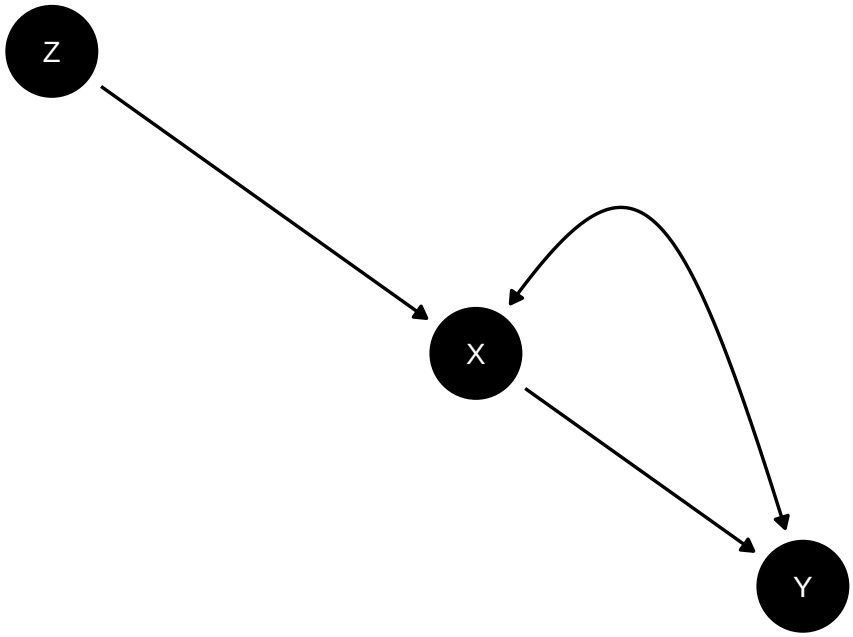

Figure 1: A simple DAG

Figure 2: **?(caption)**

3.2. Drawing data

```
model |> make_data(n = 5) |> kable()
```

Z	X	Y
0	1	0
0	1	0
0	1	1
1	1	0

Z	X	Y
1	1	1

4. Updating models

4.1. The stan model

As `update_model()` calls `rstan::sampling` one can pass along all arguments in `...` to `rstan::sampling`.

4.2. stan data

4.3. censored data

4.4. Output

The primary output from `update_model()` is a posterior distribution over model parameters, stored as a dataframe in `model$posterior_distribution`. However another of other objects are also optionally stored:

5. Querying models

5.1. Querying distributions

5.2. Case level queries

6. Illustrations

6.1. Identification with CausalQueries

Computational details

- information about certain computational details such as version numbers, operating systems, or compilers could be included in an unnumbered section. Also, auxiliary packages (say, for visualizations, maps, tables, …) that are not cited in the main text can be credited here.

:::

The results in this paper were obtained using R~3.4.1 with the **MASS**~7.3.47 package. R itself and all packages used are available from the Comprehensive R Archive Network (CRAN) at [https://CRAN.R-project.org/].

Acknowledgments

All acknowledgments (note the AE spelling) should be collected in this unnumbered section before the references. It may contain the usual information about funding and feedback from colleagues/reviewers/etc. Furthermore, information such as relative contributions of the authors may be added here (if any).

References

More technical details

Appendices can be included after the bibliography (with a page break). Each section within the appendix should have a proper section title (rather than just *Appendix*).
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- Title vs. sentence case.
- Graphics formatting.
- Naming conventions.
- Turning JSS manuscripts into R package vignettes.
- Trouble shooting.
- Many other potentially helpful details…

Using BibTeX

References need to be provided in a BibTeX file (`.bib`). All references should be made with `@cite` syntax. This commands yield different formats of author-year citations and allow to include additional details (e.g.,pages, chapters, …) in brackets. In case you are not familiar with these commands see the JSS style FAQ for details.
Cleaning up BibTeX files is a somewhat tedious task – especially when acquiring the entries automatically from mixed online sources. However, it is important that informations are complete and presented in a consistent style to avoid confusions. JSS requires the following format.

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- item Titles should be in title case.
- item Journal titles should not be abbreviated and in title case.
- item DOIs should be included where available.
- item Software should be properly cited as well. For R packages `citation("pkgname")` typically provides a good starting point.

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