

# Package ‘damr’

November 16, 2020

**Title** Interface to Drosophila Activity Monitor System Result Files

**Date** 2020-09-14

**Version** 0.3.7

**Description** Loads behavioural data from the widely used Drosophila Activity Monitor System (DAMS, TriKinetics <<https://trikinetics.com/>>) into the rethomics framework.

**Depends** R (>= 3.00),  
behavr,  
data.table

**Imports** readr

**Suggests** testthat,  
covr,  
knitr,  
ggetho,  
zeitgebr

**License** GPL-3

**Encoding** UTF-8

**LazyData** true

**URL** <https://github.com/rethomics/damr>

**BugReports** <https://github.com/rethomics/damr/issues>

**RoxygenNote** 7.1.1

**Roxygen** list(markdown = TRUE)

## R topics documented:

damr_example . . . . .	2
link_dam_metadata . . . . .	2
load_dam . . . . .	3
read_dam_file . . . . .	5
single_file_metadata . . . . .	6
two_files_metadata . . . . .	6

<b>Index</b>	<b>8</b>
--------------	----------

---

damr_example	<i>Get path to damr example</i>
--------------	---------------------------------

---

### Description

damr comes with a sample DAM2 files in its inst/extdata directory. damr\_example allow make them easy to access.

### Usage

```
damr_example(path = NULL)
```

```
damr_example_dir()
```

### Arguments

path	Name of file. If NULL, the example files will be listed.
------	----------------------------------------------------------

### Author(s)

Hadley Wickham (modified from readr)

### Examples

```
# list all files
damr_example()
# get path to one file
damr_example("M014.txt")
# get the directory with all the files
damr_example_dir()
```

---

link_dam_metadata	<i>Link DAM2 or DAM5 metadata to result files</i>
-------------------	---------------------------------------------------

---

### Description

This function checks and add columns to DAMS metadata. This way, it can subsequently be loaded (via [load\\_dam](#)).

### Usage

```
link_dam_metadata(x, result_dir)
```

### Arguments

x	object such as a <a href="#">data.frame</a> , or the name of a file (see detail)
result_dir	the root directory where all daily data are saved

## Details

These function will augment metadata from two different types of inputs:

1. A [data.frame](#) (recommended) In this case, the function will try to match requested data with data available on `result_dir`. The provided [data.frame](#) or [data.table](#) has typically one row per requested individual and the columns (not necessarily in this order):
  - `file` – the name of a data file (e.g. "Monitor3.txt"), it has to exists in `result_dir`.
  - `start_datetime` – the first day **and time** of the requested experiment (e.g. "2014-12-28 18:00:00").
  - `stop_datetime` – the last day and time of the requested experiment (e.g. "2014-12-30 19:00:00" or simply "2014-12-30").
  - `region_id` – the channel (between 1 and 32) in which the animal was in (e.g. 20). `region_id` is optional. If not provided, all 32 channels are loaded *with the same conditions*.
  - `???` *any number of arbitrary columns* to associate conditions/treatments/genotypes/... to the previous columns.
2. The name of a CSV file that contains a table as described in 1.

The time in data is expressed relatively to `start_date`. In other words, if you do circadian analysis, and your D → L transitions are at 09:00:00, you want to set `start_datetime` = "YYY-MM-DD 09:00:00". The `result_directory` is the folder containing all result (.txt) files (for instance, `result_dir` = "C:/where/I/Store/my/txt/files/")

## Value

a [data.table::data.table](#) with the same rows as `x`, and extra columns used for further data loading

## References

- [the rethomics workflow](#) – on the concept of "linking"
- [metadata tutorial](#) – how to work with metadata

## See Also

- [load\\_dam](#) – to subsequently load the actual data

---

load\_dam

*Load DAMS data from one or several continuous text files*

---

## Description

Uses "linked metadata" to load data from either single beam (DAM2) or multibeam (DAM5) arrays.

## Usage

```
load_dam(metadata, date_format = "%d %b %y", FUN = NULL, ...)
```

## Arguments

metadata	<a href="#">data.table::data.table</a> used to load data (see detail)
date_format	How dates are formatted in the DAM result files (see <a href="#">read_dam_file</a> )
FUN	function (optional) to transform the data from each animal immediately after is has been loaded.
...	extra arguments to be passed to FUN

## Details

The linked metadata should be generated using [link\\_dam\\_metadata](#).

## Value

A [behavr::behavr](#) table. In addition to the metadata, it contains the data, with the columns:

- id – autogenerated unique identifier, one per animal
- t – time
- activity – number of beam crosses

## References

- [damr tutorial](#) – how to use this function in practice

## See Also

- [behavr::behavr](#) – the class of the resulting object
- [read\\_dam\\_file](#) – to load data from a single file (without metadata)

## Examples

```
# This is where our toy data lives
root_dir <- damr_example_dir()

# Metadata already made for us.
# It defines condition and genotype of each animal
data(single_file_metadata)
print(single_file_metadata)
# Linking:
metadata <- link_dam_metadata(single_file_metadata, root_dir)

# We find and load the matching data
dt <- load_dam(metadata)
print(dt)
# An example of the use of FUN,
# we load only the first few reads by run `head()` on each animal,
# on the fly (no pun intended)
dt <- load_dam(metadata, FUN = head)
print(dt)
```

---

read_dam_file	<i>Reads data from a single DAM2 single beam or a DAM5 multibeam file</i>
---------------	---------------------------------------------------------------------------

---

## Description

This function retrieves activity data in a DAMS text file. It allows selection of a date range and channels (i.e. regions).

## Usage

```
read_dam_file(
  path,
  region_id = 1:32,
  start_datetime = -Inf,
  stop_datetime = +Inf,
  tz = "UTC",
  date_format = "%d %b %y"
)
```

## Arguments

path	location of the file to read (character)
region_id	vector of unique regions to read
start_datetime, stop_datetime	the start and the end of an the experiment (see details)
tz	the timezone (see <a href="#">OlsonNames</a> for a list)
date_format	the format of the dates in the DAM file (see details)

## Details

start\_datetime and stop\_datetime are formatted as "YYYY-MM-DD HH:MM:SS". start\_datetime is used as the reference time (ZT0). Therefore, if you are interested in circadian analysis and D → L transitions are at 10:00:00, you probably want to set start\_datetime = "YYYY-MM-DD 10:00:00".

According to the acquisition system, the date format can be inconsistently formatted between DAM Systems. Specify the format using [strptime](#) syntax. For instance:

- "%d %b %y" – the default, to parse "15 Nov 2019"
- "%d-%m-%y" – to parse "15-11-2019"
- "%Y-%m-%d" – the default to parse "2019-11-15"

## Value

A [behav](#) table. The metadata contains an autogenerated id per animal. The data has the columns:

- id – autogenerated unique identifier, one per animal
- t – time
- activity – number of beam crosses

**See Also**

- [load\\_dam](#) – to load data from many files and biological conditions using metadata (the recommended alternative)

**Examples**

```
path <- damr_example("M064.txt")
dt <- read_dam_file(path, region_id = c(1:3), start_datetime = "2017-06-30 15:00:00")
print(dt)
```

---

single_file_metadata	<i>A simple toy metadata defining the experimental conditions of 32 animals monitored at the same time in a single DAM2 monitor. Each animal has its own channel (region_id), as well as a condition and genotype. It serves as an example for <a href="#">link_dam_metadata</a>.</i>
----------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

---

**Description**

A simple toy metadata defining the experimental conditions of 32 animals monitored at the same time in a single DAM2 monitor. Each animal has its own channel (region\_id), as well as a condition and genotype. It serves as an example for [link\\_dam\\_metadata](#).

**Usage**

```
single_file_metadata
```

**Format**

An object of class `data.frame` with 32 rows and 6 columns.

**Author(s)**

Quentin Geissmann

---

two_files_metadata	<i>A toy metadata defining the experimental conditions of 64 animals monitored at the same time in two separate DAM2 monitors. Each animal has its own channel (region_id), as well as a condition and genotype. It serves as an example for <a href="#">link_dam_metadata</a>.</i>
--------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

---

**Description**

A toy metadata defining the experimental conditions of 64 animals monitored at the same time in two separate DAM2 monitors. Each animal has its own channel (region\_id), as well as a condition and genotype. It serves as an example for [link\\_dam\\_metadata](#).

*two\_files\_metadata*

7

**Usage**

`two_files_metadata`

**Format**

An object of class `data.frame` with 64 rows and 6 columns.

**Author(s)**

Quentin Geissmann

# Index

## \* datasets

single\_file\_metadata, [6](#)

two\_files\_metadata, [6](#)

behavr, [5](#)

behavr::behavr, [4](#)

damr\_example, [2](#)

damr\_example\_dir (damr\_example), [2](#)

data.frame, [2](#), [3](#)

data.table, [3](#)

data.table::data.table, [3](#), [4](#)

link\_dam2\_metadata (link\_dam\_metadata),  
[2](#)

link\_dam\_metadata, [2](#), [4](#), [6](#)

load\_dam, [2](#), [3](#), [3](#), [6](#)

load\_dam2 (load\_dam), [3](#)

OlsonNames, [5](#)

read\_dam2\_file (read\_dam\_file), [5](#)

read\_dam\_file, [4](#), [5](#)

single\_file\_metadata, [6](#)

strptime, [5](#)

two\_files\_metadata, [6](#)