

Package ‘cdiWG2WS’

May 8, 2026

Title Words and Gestures to Words and Sentences Score Conversion

Version 0.2.0

Description Convert MacArthur-Bates Communicative Development Inventory Words and Gestures scores to would-be scores on Words and Sentences, based on modeling from the Stanford Wordbank <<https://wordbank.stanford.edu/>>. See Day et al. (2025) <[doi:10.1111/desc.70036](https://doi.org/10.1111/desc.70036)>.

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.3.2

Depends R (>= 3.5.0)

LazyData true

Suggests testthat (>= 3.0.0), wordbankr (>= 1.0)

Config/testthat/edition 3

NeedsCompilation no

Author Trevor K.M. Day [cre, aut] (ORCID: <<https://orcid.org/0000-0003-2911-8312>>)

Maintainer Trevor K.M. Day <trevor.day@georgetown.edu>

Repository CRAN

Date/Publication 2025-06-17 07:20:01 UTC

Contents

cat_models_stripped	2
cw_noage_stripped	2
cw_stripped	3
g_dict	3
s_dict	4
total_WG_to_WS_noage_stripped	4
total_WG_to_WS_stripped	5
wg2ws_category_score	6

wg2ws_get_cat_function	7
wg2ws_items	8
wg2ws_list_items	9
wg2ws_summarize_cat	9
wg2ws_total_age	10

Index 12

cat_models_stripped *Predict category scores*

Description

Predict category scores

Usage

cat_models_stripped

Format

An object of many linear models.

Linear models predicting WS category scores from WG score and age. The embedded data have been stripped from the object.

References

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language*, 44(3), 677-694. doi:10.1017/S0305000916000209

cw_noage_stripped *Predict Connecting Words scores (no age)*

Description

Predict Connecting Words scores (no age)

Usage

cw_noage_stripped

Format

Linear model

A linear model predicting Connecting Words scores from other scores (no age). The embedded data have been stripped from the object.

References

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language*, 44(3), 677-694. doi:10.1017/S0305000916000209

cw_stripped	<i>Predict Connecting Words scores</i>
-------------	--

Description

Predict Connecting Words scores

Usage

cw_stripped

Format

Linear model

A linear model predicting Connecting Words scores from other scores and age. The embedded data have been stripped from the objects.

References

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language*, 44(3), 677-694. doi:10.1017/S0305000916000209

g_dict	<i>WG dictionary: items, categories</i>
--------	---

Description

WG dictionary: items, categories

Usage

g_dict

Format

A data frame with 396 rows and 4 columns:

category Name of category

item_definition Item label, e.g. "baa baa"

item_id Unique ID

item_kind Type of item, only "word"

References

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language*, 44(3), 677-694. doi:10.1017/S0305000916000209

s_dict	<i>WS dictionary: items, categories</i>
--------	---

Description

WS dictionary: items, categories

Usage

s_dict

Format

A data frame with 680 rows and 4 columns:

category Name of category

item_definition Item label, e.g. "baa baa"

item_id Unique ID

item_kind Type of item, only "word"

References

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language*, 44(3), 677-694. doi:10.1017/S0305000916000209

total_WG_to_WS_noage_stripped	<i>Predict total score</i>
-------------------------------	----------------------------

Description

Predict total score

Usage

total_WG_to_WS_noage_stripped

Format

A linear model

A linear model predicting WS score from WG score (no age). The embedded data have been stripped from the object.

References

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language*, 44(3), 677-694. doi:10.1017/S0305000916000209

total_WG_to_WS_stripped

Predict total score (w/ age)

Description

Predict total score (w/ age)

Usage

total_WG_to_WS_stripped

Format

A linear model

A linear model predicting WS score from WG score and age. The embedded data have been stripped from the object.

References

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2017). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language*, 44(3), 677-694. doi:10.1017/S0305000916000209

wg2ws_category_score *Simulate WS category score from given WG score*

Description

Take 22 WG scores and simulates WS scores for each one.

Usage

```
wg2ws_category_score(wg_table, age = NA, WG_total = NA, verbose = FALSE)
```

Arguments

wg_table	A 22-row table with the columns category and n. Includes Sounds and Connecting Words.
age	(Optional). Age in months. If unset, models not including age are used
WG_total	NA/numeric: In the case of in/inside, the WG score model can be off-by-one. Out of so many items, this is negligible, but can be set explicitly here.
verbose	T/F: Be verbose.

Details

This function predicts simulated WS scores for each category score independently. If an age is not supplied, models not using age are used (less accurate than including age).

Value

New scores (data frame of 22 scores)

References

Day, T. K. M., Borovsky, A., Thal, D., & Elison, J. T. (2025). Modeling Longitudinal Trajectories of Word Production With the CDI. *Developmental Science*, 28(4), e70036. doi:10.1111/desc.70036

Examples

```
# Create list of words a child knows
words <- c("smile", "old", "chicken (animal)", "breakfast", "snow", "uh oh",
          "please", "bad", "bicycle", "moon")

# Create table
wg_categories <- wg2ws_items(words)

# Convert to WS score
ws_categories <- wg2ws_category_score(wg_categories, age = 20)
```

`wg2ws_get_cat_function`*Get function for category/age combination*

Description

Returns a model object to predict category score given category and age.

Usage

```
wg2ws_get_cat_function(the_category, age = TRUE, echo_only = FALSE)
```

Arguments

<code>the_category</code>	Which category to use, following Wordbank naming convention. Options: sounds, animals, vehicles, toys, food_drink, clothing, body_parts, household, furniture_rooms, outside, places, people, games_routines, action_words, descriptive_words, time_words, pronouns, question_words, locations, quantifiers, helping_verbs, connecting_words
<code>age</code>	T/F. If TRUE, return model that uses age as predictor.
<code>echo_only</code>	T/F. If FALSE, returns model as function; if TRUE echoes as human readable.

Details

This is mostly an internal function, but is exposed in case somebody needs it. Returns a `lm()` object that has had the embedded data stripped, given a category and whether to model age.

Value

Function or NULL

References

Day, T. K. M., Borovsky, A., Thal, D., & Elison, J. T. (2025). Modeling Longitudinal Trajectories of Word Production With the CDI. *Developmental Science*, 28(4), e70036. doi:10.1111/desc.70036

Examples

```
wg2ws_get_cat_function("time_words", age = TRUE)
```

 wg2ws_items

List of items to category table

Description

Given a list of items, create a table of category scores

Usage

```
wg2ws_items(items, error_on_missing = TRUE, in_inside = "either")
```

Arguments

items	List of WG items present for individual.
error_on_missing	If TRUE, check whether all items are actual WG items. See helper function wg2ws_list_items() .
in_inside	"In" and "inside" appear as two items on WG, but one ("inside/in") on WS. If "either," treat "inside/in" as endorsed if either appears. For "both", both must be endorsed. For "in" or "inside", treat "inside/in" as endorsed based solely on the presence of the indicated item.

Details

Requires a list that exactly matches items as labeled from Wordbank (check [g_dict](#)). Converts to a table of category scores, ready for use with [wg2ws_category_score\(\)](#).

Value

A data frame with 22 rows indicating item totals for all WS categories. These values are *not* adjusted, and need to be adjusted with [wg2ws_category_score\(\)](#).

Examples

```
# Create list of words a child knows
words <- c("smile", "old", "chicken (animal)", "breakfast", "snow", "uh oh",
          "please", "bad", "bicycle", "moon")
# Create table
categories <- wg2ws_items(words)
```

wg2ws_list_items	<i>List instrument items</i>
------------------	------------------------------

Description

List instrument items

Usage

```
wg2ws_list_items(instrument)
```

Arguments

instrument	"WG" or "WS"
------------	--------------

Details

Simply list the items from each instrument for convenience.

Value

List of items

Examples

```
wg2ws_list_items("WG")  
wg2ws_list_items("WS")
```

wg2ws_summarize_cat	<i>Summarize category table</i>
---------------------	---------------------------------

Description

Summarize category table

Usage

```
wg2ws_summarize_cat(category_scores)
```

Arguments

category_scores	A 22x2 category result table
-----------------	------------------------------

Details

Given a 22x2 category table, calculate total scores and lexical and syntax scores.

Value

A three column data frame, with total score, lexical, and syntactic scores

References

Day, T. K. M., & Elison, J. T. (2021). A broadened estimate of syntactic and lexical ability from the MB-CDI. *Journal of Child Language*, 49(3), 615-632. doi:10.1017/S0305000921000283

Examples

```
words <- c("smile", "old", "chicken (animal)", "breakfast", "snow", "uh oh",
           "please", "bad", "bicycle", "moon")

categories <- wg2ws_items(words)
scores <- wg2ws_summarize_cat(categories)
```

wg2ws_total_age	<i>Calculate WS total score from WG score.</i>
-----------------	--

Description

Calculate WS total score from WG score.

Usage

```
wg2ws_total_age(WG, age = NA)
```

Arguments

WG	Words and Gestures total score.
age	Age in months (optional). A different, more accurate model is used if age is supplied.

Details

Given a single number (WG total score) and optionally age, calculate a WG score.

Value

Adjusted score, rounded to the nearest integer. Does not return values below 0 or greater than 680.

References

Day, T. K. M., Borovsky, A., Thal, D., & Elison, J. T. (2025). Modeling Longitudinal Trajectories of Word Production With the CDI. *Developmental Science*, 28(4), e70036. doi:10.1111/desc.70036

Examples

```
wg2ws_total_age(200)  
wg2ws_total_age(200, age = 21)
```

Index

* datasets

- cat_models_stripped, 2
- cw_noage_stripped, 2
- cw_stripped, 3
- g_dict, 3
- s_dict, 4
- total_WG_to_WS_noage_stripped, 4
- total_WG_to_WS_stripped, 5

- cat_models_stripped, 2
- cw_noage_stripped, 2
- cw_stripped, 3

- g_dict, 3, 8

- s_dict, 4

- total_WG_to_WS_noage_stripped, 4
- total_WG_to_WS_stripped, 5

- wg2ws_category_score, 6
- wg2ws_category_score(), 8
- wg2ws_get_cat_function, 7
- wg2ws_items, 8
- wg2ws_list_items, 9
- wg2ws_list_items(), 8
- wg2ws_summarize_cat, 9
- wg2ws_total_age, 10