Package 'foodquotient'

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Type Package

Title Food Quotient and Nutrient Analysis for HSFFQ

Version 0.1.1

Description Aids in analysing data from a food frequency questionnaire known as the Harvard Service Food Frequency Questionnaire (HSFFQ).
Functions from this package use answers from the HSFFQ to generate estimates of daily consumed micronutrients, calories, macronutrients on an individual level.
The package also calculates food quotients on individual and group levels.
Foodquotient calculation is an often tedious step in the calculation of total human energy expenditure (TEE) using the doubly labeled water method, which is the gold standard for measuring TEE.

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`age_freq` *Frequency Factors for American Children with Age of Participant*

Description

A small set of food frequency questionnaire data including 32 children living in the United States. f1:f85 represents the frequency with which participants consumed 85 respective foods. Numbers 1-9 correspond to the following: 1: never 2: 1-3 times per month 3: once per week 4: 2-4 times per week 5: 5-6 times per week 6: 1 per day 7: 2-3 times per day 8: 4-5 times per day 9: 6 times per day

Usage

```
age_freq
```

Format

'age_freq' A data frame with 32 rows and 86 columns:

a age of participant

f1 milk frequency factor

f2 hot chocolate frequency factor

f3 cheese frequency factor

f4 yogurt frequency frequency factor

f5 ice cream frequency frequency factor

f6 pudding frequency factor

f7 orange juice frequency factor

f8 other juice frequency factor

f9 fruit drink frequency factor

f10 banana frequency factor

f11 peaches frequency factor

f12 mixed fruit frequency factor

f13 orange frequency factor

f14 apple and pear frequency factor

f15 applesauce frequency factor

f16 grapes frequency factor
f17 strawberries frequency factor
f18 melon frequency factor
f19 pineapple frequency factor
f20 raisins frequency factor
f21 corn frequency factor
f22 peas frequency factor
f23 tomato frequency factor
f24 peppers frequency factor
f25 carrot frequency factor
f26 broccoli frequency factor
f27 green beans frequency factor
f28 spinach frequency factor
f29 greens frequency factor
f30 mixed vegetable frequency factor
f31 squash frequency factor
f32 zucchini frequency factor
f33 fried potatoes frequency factor
f34 other potatoes frequency factor
f35 sweet potatoes frequency factor
f36 cabbage frequency factor
f37 lettuce frequency factor
f38 mayonnaise frequency factor
f39 chips frequency factor
f40 popcorn frequency factor
f41 crackers frequency factor
f42 nuts frequency factor
f43 cookies frequency factor
f44 cake frequency factor
f45 pie frequency factor
f46 jello frequency factor
f47 chocolate frequency factor
f48 candy frequency factor
f49 coffee frequency factor
f50 soda frequency factor
f51 sugarfree soda frequency factor
f52 beans frequency factor

f53 rice frequency factor

f54 pasta frequency factor

f55 pizza frequency factor

f56 tacos frequency factor

f57 mac and cheese frequency factor

f58 hot dogs frequency factor

f59 sausage frequency factor

f60 hamburger frequency factor

f61 tuna frequency factor

f62 fried fish frequency factor

f63 other fish frequency factor

f64 cold cuts frequency factor

f65 chicken nuggets frequency factor

f66 other chicken frequency factor

f67 pork frequency factor

f68 beef frequency factor

f69 organ meats frequency factor

f70 peanut butter frequency factor

f71 bread frequency factor

f72 butter frequency factor

f73 margarine frequency factor

f74 vegetabele soup frequency factor

f75 soup frequency factor

f76 tortilla frequency factor

f77 eggs frequency factor

f78 bacon frequency factor

f79 hot cereal frequency factor

f80 cold cereal frequency factor

f81 donuts frequency factor

f82 muffins frequency factor

f83 pancake frequency factor

f84 bagel frequency factor

f85 biscuit frequency factor

Source

<Baylor Human Evolutionary Biology and Health Lab>

fq *Frequency Factor*

Description

The Frequency Factor function converts values 1-9, representing different frequency factor responses from the hsffq, to average daily servings consumed for that individual.

Usage

```
fq(f)
```

Arguments

f	1-9, representing different frequency factor responses from the hsffq. These can be in a dataframe, vector, or just single values

Value

a dataframe, vector, or single value of the same dimension as the input, with each position holding the average daily servings consumed for each food (columns) for each individual(rows).

Examples

```
test <- c(1, 5, 7, 3, 9, 2, 4, 3, 6, 8)
fq(test)

rquestionnaire <- function(n, n_food_questions = 85) {
  mat <- matrix(
    sample(1:9, n_food_questions*n, replace = TRUE),
    nrow = n, ncol = n_food_questions
  )
  df <- data.frame( age = round(runif(n, 2, 11), digits = 1) )
  cbind(df, as.data.frame(mat))
}
df <- rquestionnaire(6)

fq(df)
```

`freq` *Frequency Factors for American Children*

Description

A small set of data including 32 children living in the United States. f1:f85 represents the frequency with which participants consumed 85 respective foods. Numbers 1-9 correspond to the following: 1: never 2: 1-3 times per month 3: once per week 4: 2-4 times per week 5: 5-6 times per week 6: 1 per day 7: 2-3 times per day 8: 4-5 times per day 9: 6 times per day

Usage

```
freq
```

Format

'freq' A data frame with 32 rows and 85 columns:

f1 milk frequency factor

f2 hot chocolate frequency factor

f3 cheese frequency factor

f4 yogurt frequency frequency factor

f5 ice cream frequency frequency factor

f6 pudding frequency factor

f7 orange juice frequency factor

f8 other juice frequency factor

f9 fruit drink frequency factor

f10 banana frequency factor

f11 peaches frequency factor

f12 mixed fruit frequency factor

f13 orange frequency factor

f14 apple and pear frequency factor

f15 applesauce frequency factor

f16 grapes frequency factor

f17 strawberries frequency factor

f18 melon frequency factor

f19 pineapple frequency factor

f20 raisins frequency factor

f21 corn frequency factor

f22 peas frequency factor

f23 tomato frequency factor
f24 peppers frequency factor
f25 carrot frequency factor
f26 broccoli frequency factor
f27 green beans frequency factor
f28 spinach frequency factor
f29 greens frequency factor
f30 mixed vegetable frequency factor
f31 squash frequency factor
f32 zucchini frequency factor
f33 fried potatoes frequency factor
f34 other potatoes frequency factor
f35 sweet potatoes frequency factor
f36 cabbage frequency factor
f37 lettuce frequency factor
f38 mayonnaise frequency factor
f39 chips frequency factor
f40 popcorn frequency factor
f41 crackers frequency factor
f42 nuts frequency factor
f43 cookies frequency factor
f44 cake frequency factor
f45 pie frequency factor
f46 jello frequency factor
f47 chocolate frequency factor
f48 candy frequency factor
f49 coffee frequency factor
f50 soda frequency factor
f51 sugarfree soda frequency factor
f52 beans frequency factor
f53 rice frequency factor
f54 pasta frequency factor
f55 pizza frequency factor
f56 tacos frequency factor
f57 mac and cheese frequency factor
f58 hot dogs frequency factor
f59 sausage frequency factor

f60 hamburger frequency factor

f61 tuna frequency factor

f62 fried fish frequency factor

f63 other fish frequency factor

f64 cold cuts frequency factor

f65 chicken nuggets frequency factor

f66 other chicken frequency factor

f67 pork frequency factor

f68 beef frequency factor

f69 organ meats frequency factor

f70 peanut butter frequency factor

f71 bread frequency factor

f72 butter frequency factor

f73 margarine frequency factor

f74 vegetabele soup frequency factor

f75 soup frequency factor

f76 tortilla frequency factor

f77 eggs frequency factor

f78 bacon frequency factor

f79 hot cereal frequency factor

f80 cold cereal frequency factor

f81 donuts frequency factor

f82 muffins frequency factor

f83 pancake frequency factor

f84 bagel frequency factor

f85 biscuit frequency factor

Source

<Baylor Human Evolutionary Biology Lab>

grams *Grams*

Description

The grams function takes the age of a participant and their responses on the hsffq to generate an estimate of the participant's total daily grams consumed for each food.

Usage

```
grams(row)
```

Arguments

row	A numeric vector with components 'age', representing the age of the participant, and 'f1' to 'f85', representing different frequency factor responses from the hsffq.

Value

A numeric vector of length 85, representing the estimated total daily grams of each food consumed for the participant.

Examples

```
random_integers <- sample(1:9, 85, replace=TRUE)
vec <- c(6.2, random_integers)
grams(vec)

rquestionnaire <- function(n, n_food_questions = 85) {
  mat <- matrix(
    sample(1:9, n_food_questions*n, replace = TRUE),
    nrow = n, ncol = n_food_questions
  )
  df <- data.frame( age = round(runif(n, 2, 11), digits = 1) )
  cbind(df, as.data.frame(mat))
}
df <- rquestionnaire(2)

df_results <- data.frame()
for (i in 1:nrow(df)) {
  result <- grams(df[i,])
  df_results <- rbind(df_results, result)
}
```

hsffq *Harvard Foood Frequency Questionnaire Nutrition Information*

Description

This dataframe is used internally by the functions of foodquotient and includes portion size information by age for each of the 85 foods included in the HSFFQ from the HSFFQ user's manual. Additionally, nutrient information is included for each of the 85 foods, pulled from the USDA's public search tool.

Usage

```
hsffq()
```

Value

A portion size and nutrient information reference data frame.

macquotient *Food Quotient Based on Macronutrients*

Description

The macquotient function calculates a food quotient for a participant based on average daily protein, carbs, and fat consumed for an individual or a group. In contrast to the quotient function, macquotient is able to generate reliable average food quotients for a group of people rather than only individual level. Group level estimates are recomended in some studies to control for response bias.

Usage

```
macquotient(row)
```

Arguments

row	contains three components. p average daily grams of protein consumed f average daily grams of fat consumed c/ average daily grams of carbohydrates consumed

Value

one value per participant will be returned, representing the food quotient for the individual

Examples

```
vec <- c(34.5,43, 212.4)
macquotient(vec)


vec1 <- c(34.5,43, 212.4)
vec2 <- c(40.1,52, 240)
df <- rbind(vec1, vec2)

df_results <- data.frame()
for (i in 1:nrow(df)) {
result <- macquotient(df[i,])
df_results <- rbind(df_results, result)
}
```

---

macros *Macronutrients*

Description

The Macronutrients function takes the age of a participant and their responses on the hsffq to generate estimates of the participant's total daily protein, carbohydrate, and fat consumed for each food.

Usage

```
macros(row)
```

Arguments

row	vector with 86 entries consisting of 2 components f1:f85 1-9, representing different frequency factor responses from the hsffq. These will be stored in columns 2-86 in the row you plug in A value representing participant's age. This will be stored in column 1 of the input row

Value

the row or dataframe returned will have 3 entries, representing total daily amounts of protein, carbohydrates, and fat for each participant

Examples

```
 random_integers <- sample(1:9, 85, replace=TRUE)
vec <- c(6.2, random_integers)
grams(vec)

rquestionnaire <- function(n, n_food_questions = 85) {
  mat <- matrix(
```

```
    sample(1:9, n_food_questions*n, replace = TRUE),
    nrow = n, ncol = n_food_questions
  )
  df <- data.frame( age = round(runif(n, 2, 11), digits = 1) )
  cbind(df, as.data.frame(mat))
}
df <- rquestionnaire(3)

df_results <- data.frame()
for (i in 1:nrow(df)) {
result <- macros(df[i,])
df_results <- rbind(df_results, result)
}
```

---

micros *Micronutrients*

Description

The Micronutrients function takes the age of a participant and their responses on the hsffq to generate an estimate of the participant's total daily micronutrients consumed for each food.

Usage

```
micros(row)
```

Arguments

row	contains two components. f1:f85 1-9, representing different frequency factor responses from the hsffq. These will be stored in columns 2-86 in the row you plug in . A value representing participant's age. This will be stored in column 1 of the input row

Value

the row or dataframe returned will have 7 entries, representing total daily amounts of 7 micronutrients for each participant

Examples

```
random_integers <- sample(1:8, 85, replace=TRUE)
vec <- c(6.2, random_integers)
micros(vec)

rquestionnaire <- function(n, n_food_questions = 85) {
  mat <- matrix(
    sample(1:9, n_food_questions*n, replace = TRUE),
    nrow = n, ncol = n_food_questions
```

```
  )
  df <- data.frame( age = round(runif(n, 2, 11), digits = 1) )
  cbind(df, as.data.frame(mat))
}
df <- rquestionnaire(4)

df_results <- data.frame()
for (i in 1:nrow(df)) {
result <- micros(df[i,])
df_results <- rbind(df_results, result)
}
```

---

nutrients *Nutrients*

Description

The Nutrients function takes the age of a participant and their responses on the hsffq to generate an estimate of the participant's total daily micronutrients, macronutrients, and calories consumed for each food

Usage

```
nutrients(row)
```

Arguments

row	/contains two components. f1:f85 1-9, representing different frequency factor responses from the hsffq. These will be stored in columns 2-86 in the row you plug in A value representing participant's age. This will be stored in column 1 of the input row

Value

the row or dataframe returned will have 11 entries, representing total daily amounts of 7 micronutrients, 3 macronutrients, and calories for each participant. These columns will be labeled

Examples

```
random_integers <- sample(1:8, 85, replace=TRUE)
vec <- c(6.2, random_integers)
nutrients(vec)

rquestionnaire <- function(n, n_food_questions = 85) {
  mat <- matrix(
    sample(1:9, n_food_questions*n, replace = TRUE),
    nrow = n, ncol = n_food_questions
```

```
  )
  df <- data.frame( age = round(runif(n, 2, 11), digits = 1) )
  cbind(df, as.data.frame(mat))
}
df <- rquestionnaire(5)

df_results <- data.frame()
for (i in 1:nrow(df)) {
result <- nutrients(df[i,])
df_results <- rbind(df_results, result)
}
```

---

quotient *Food quotient based on hsffq results*

Description

The quotient function calculates individual level food quotients based on the individual's answers to the hsffq. This function is only recommended to calculate at the individual level.

Usage

```
quotient(row)
```

Arguments

row	contains two components. f1:f85 1-9, representing different frequency factor responses from the hsffq. These will be stored in columns 2-86 in the row you plug in A value representing participant's age. This will be stored in column 1 of the input row/

Value

one value per participant will be returned, representing the food quotient for the individual

Examples

```
random_integers <- sample(1:8, 85, replace=TRUE)
vec <- c(6.2, random_integers)
quotient(vec)

rquestionnaire <- function(n, n_food_questions = 85) {
  mat <- matrix(
    sample(1:9, n_food_questions*n, replace = TRUE),
    nrow = n, ncol = n_food_questions
  )
  df <- data.frame( age = round(runif(n, 2, 11), digits = 1) )
```

```
  cbind(df, as.data.frame(mat))
}
df <- rquestionnaire(6)

df_results <- data.frame()
for (i in 1:nrow(df)) {
result <- quotient(df[i,])
df_results <- rbind(df_results, result)
}
```

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