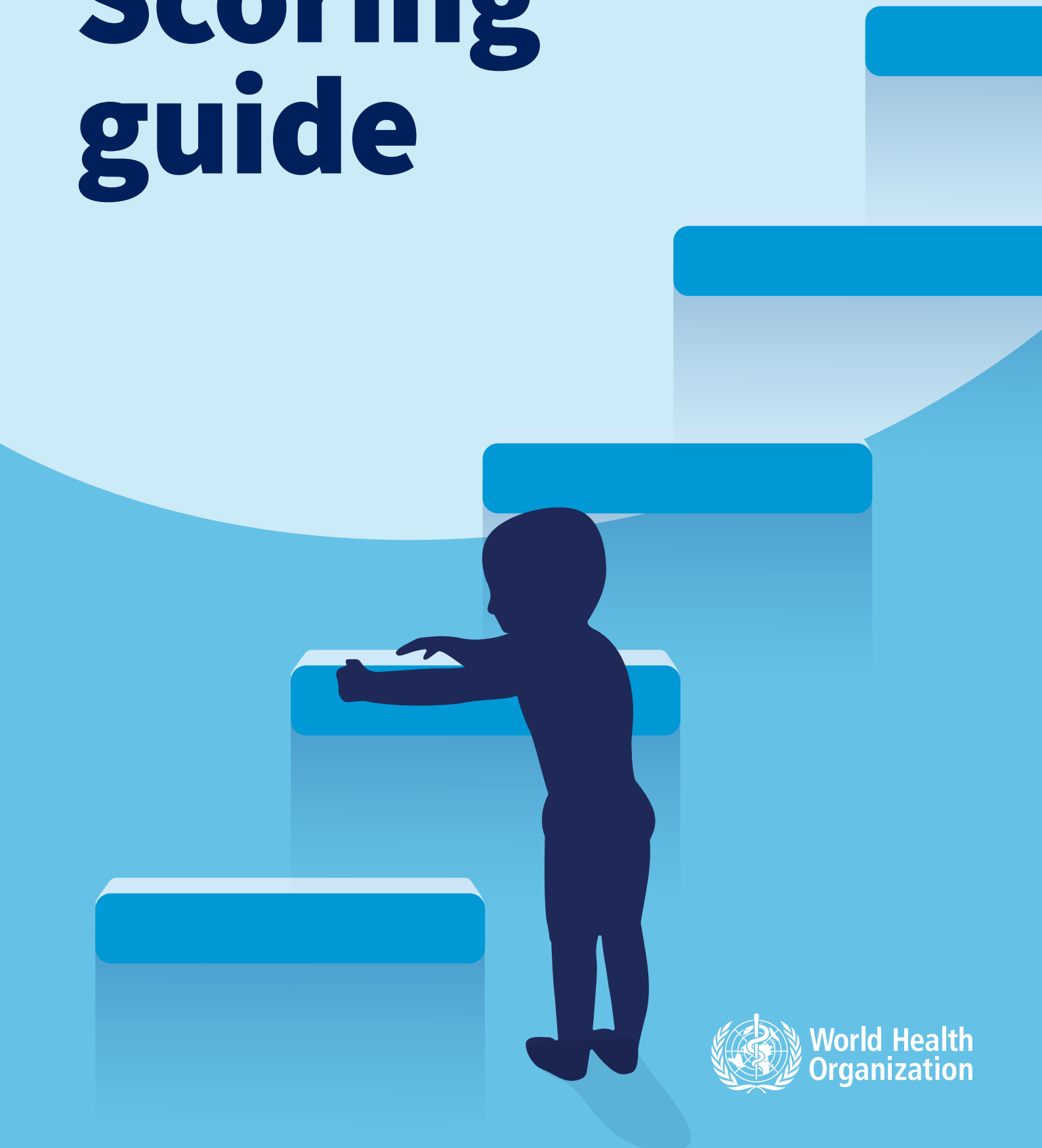
Global Scales for Early Development v1.0

Scoring guide



World Health Organization

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WHO/MSD/GSED package v1.0/2023.8

Global Scales for Early Development v1.0 Technical report – Global Scales for Early Development v1.0 Short Form (caregiver-reported) – Global Scales for Early Development v1.0 Short Form (caregiver-reported). Item guide – Global Scales for Early Development v1.0 Short Form (caregiver-reported). User manual – Global Scales for Early Development v 1.0 Long Form (directly administered) – Global Scales for Early Development v 1.0 Long Form (directly administered). Item guide – Global Scales for Early Development v1.0 Long Form (directly administered). User manual – Global Scales for Early Development v1.0 Scoring guide – Global Scales for Early Development v1.0 Adaptation and translation guide

Selected questions and descriptions for the GSED measures have been reproduced or adapted from the following tools/assessments: Ages and Stages Questionnaire, third edition (ASQ-3); Bayley Scales of Infant Development (Bayley); Bayley Scales of Infant Development, second edition (Bayley II); Caregiver-Reported Early Development Instruments (CREDI); Denver Developmental Screening Test (DDST); Denver Developmental Screening Test, second edition (DDST II); Developmental Milestones Checklist (DMC); Developmental Milestones Checklist II (DMC II); Dutch Development Instrument (DDI); Griffiths Mental Development Scales (GMDS); Griffiths Mental Development Scales – South African version (GMDS-SA); Kilifi Developmental Inventory (KDI); Malawi Developmental Assessment Tool (MDAT); Preschool Pediatric Symptoms Checklist (PPSC); Saving Brains Early Childhood Development Scale (SBECD); Stanford-Binet Intelligence Scales, fifth edition (SBIS-5); Test de Desarrollo Psicomotor [Psychomotor Development Test] (TEPSI); and Vineland Adaptive Behavior Scales (Vineland) (see Bibliography for details).

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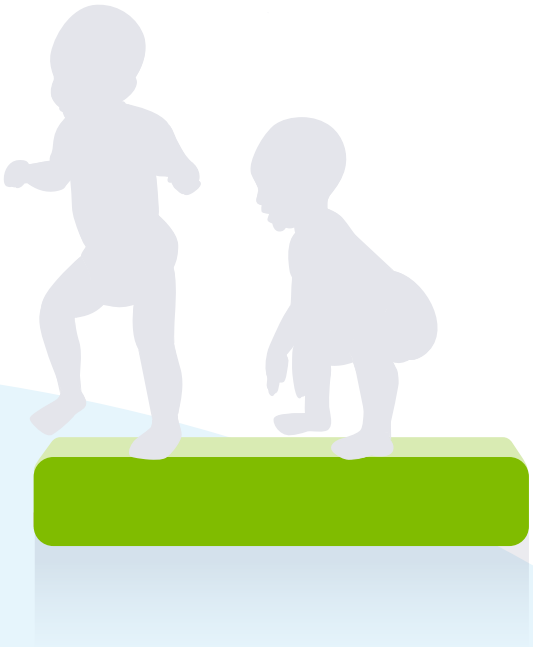

Acknowledgements

Vision and conceptualization

The Global Scales for Early Development (GSED) package v1.0 was developed under the overall guidance of and conceptualization by Tarun Dua and Dévora Kestel of the Department of Mental Health and Substance Use of the World Health Organization (WHO).

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Information technology programming

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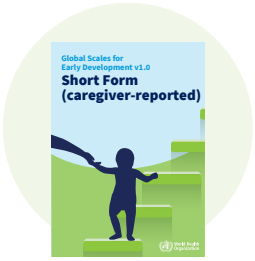
> “The GSED package v1.0 includes open-access measures that provide a standardized method for measuring the development of children up to 36 months of age across diverse cultures and contexts.”

Introduction

This *Scoring Guide* is part of a package of materials for the Global Scales for Early Development (GSED). The GSED are open-access measures that provide a standardized method for measuring the development of children up to 36 months of age across diverse cultures and contexts. They were created to serve as population-level measures of early childhood development (ECD) for the global community that can be compared across countries.

The GSED package v1.0 includes the GSED measures[1] as well as accompanying materials to facilitate their implementation and use. The GSED measures are meant to collect population-level data on ECD to be used primarily for research and programmatic evaluations. They comprise a:



Short Form (SF), a caregiver-reported measure; and

Long Form (LF), comprised of items administered directly to children by a trained assessor.

In addition to this guide, the package includes: i) GSED SF and LF measures as both a paper version and app; ii) GSED measures *Item Guides*; iii) GSED measures *Administration Manuals*; v) *Adaptation and Translation Guide* and iv) *Technical Report* summarizing the creation and validation of the GSED measures.

The GSED meets the measurement objective by incorporating all domains of child development through a common scale for measurement translated into a single score, the Developmental score (D-score), that represents holistic development. This guide provides detailed instructions on how to calculate the D-score after data is collected with the GSED measures.

The D-score

The D-score is a unit of measurement with an interval scale representing child development by a single number. As height (in centimetres) and weight (in kilograms) change over time with the growth of the child, development (measured in D-score units) also increases with age as the child acquires more skills. The D-score is calculated from Yes/No responses on a set of age-appropriate developmental items (e.g. “Can the child stack two blocks”, or “Does the child use two-word sentences?”). Conceptually, a child’s D-score falls along a developmental continuum, beginning with simple skills and behaviours that the child is able to perform and progressing through the child’s repertoire until reaching skills and behaviours that the child has yet to acquire. It is calculated as the mean of the posterior distribution conditional on the responses, the items’ difficulty and the child’s age. The D-score may also be transformed into the Development-for-Age z-score (DAZ). The DAZ is age-independent and is scaled such that at each age, the distribution of scores is normally distributed with a mean of 0 and a variance of 1. Since DAZ adjusts for the natural increase in D-score with age, it helps ease the comparison between samples from different ages or countries. Similar to height-for-age z-score (HAZ) and weight-for-age z-score (WAZ), the DAZ is calculated relative to a reference population.

1 The GSED measures also include (not part of the package v1.0 as they are still being further tested, but can be made available on request):
- Household Form (HF), caregiver-reported measure, designed to be integrated into large-scale and national-level surveys for monitoring child development; and
- Psychosocial Form (PF), caregiver-reported measure of children’s psychosocial behaviours.

Calculating the D-score and DAZ

Once the GSED SF, GSED LF or both have been administered to one or more children, the next step is to calculate the D-score and the DAZ for each child. This step is known as scoring. The present guide provides instructions on how to calculate these scores. Either of two methods may be used:

- ✓ **Online calculator.** The online Shiny App (https://d-score.org) is a convenient option for users not familiar with R. The app contains online documentation and instructions;
- ✓ **R package dscore** (https://CRAN.R-project.org/package=dscore) is a flexible option with all the tools needed to calculate the D-score. It is an excellent choice for users familiar with R and users who like to incorporate D-score calculations into a workflow.

Because development naturally occurs with age, it can be difficult to compare D-scores for children of different ages. To help solve this problem, the package also calculates preliminary DAZ scores. These DAZ scores are calculated in reference to same-age children from the Round I GSED data from both the GSED SF and GSED LF in Bangladesh, Pakistan and the United Republic of Tanzania to estimate the age-conditional distributions of scores. Using this reference group, the D-scores of new data can then be converted into standardized Z scores (with a mean of 0 and standard deviation [SD] of 1) at all ages.

While these preliminary norms are useful to adjust scores to remove the age effect, DAZ scores with the current reference population should not be interpreted as representative of any specific population or hold any special

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normative importance. They are calculated on a non-representative convenience sample. The main utility of these preliminary reference scores is to provide estimates of the stability of GSED and the D-score over time, without artificially inflating correlations due to the strong association between D-scores and age. They can also be used to provide a rough estimate of the association between D-scores and other concurrent and predictive measures.

The DAZ is **not** currently an appropriate basis for setting benchmarks and determining whether children are on or off track developmentally. The GSED team is currently working on a Norms and Standards study which aims to create a better estimate of how D-scores vary by age in a restricted population of children living without major constraints on their development. This updated DAZ will be the focus of ongoing benchmarking work and provide a better justification of cut-off points.

Preliminaries

- The R language is used. See https://www.r-project.org/about.html for more information on R;
- The R package `dscore` will need to be installed on the local machine;
- Child data need to be stored as a `data.frame`, a standard R tabular structure;
- The `dscore()` function should be run to calculate the D-score and DAZ. The function returns a table with six columns with the estimates with the same number of rows as the data.

Install the dscore package

The dscore package contains tools to:

- map item names to the GSED convention;
- calculate D-scores from item level responses;
- transform the D-scores into DAZ;

The required input consists of *item level* responses on milestones collected using instruments for measuring child development, including the GSED LF and GSED SF.

There are two versions of the dscore package. For daily use, the curated and published version on CRAN is recommended. In R, the dscore package should be installed as:

```
install.packages("dscore")
```

In some cases, a more recent version that includes extensions and bug fixes not yet available on CRAN may be needed. The development version from GitHub may be installed by:

```
install.packages("remotes")
remotes::install_github("d-score/dscore")
```

The development version requires a local C++ compiler for building the package from source. At least `dscore 1.8.0` should be used.

Response data format

Rows: one measurement, i.e. one test administration for a child at a given age, occupies a row in the data set. Thus, if a child is measured three times at different ages, there will be three rows for that child in the dataset.

Columns: there should be at least two columns in the data set:

- one column with the age of the child. The age column may have any name, and may be measured in decimal age, months or days since birth. Age should not be truncated. The value should be as continuous as possible, for example by calculating age in days by the difference between measurement date and birth date.
- one column for each item, appropriately named by the 9-position GSED item name. Normally, the items come from the same measure, but they may also come from multiple measures. The data from any recognized item name will contribute to the D-score. Names should not be duplicated in the data. A PASS or YES is coded as 1, a FAIL or NO as 0. If there is no answer or if the item was not administered, the missing value code NA should be used. Items that are never administered may be coded as all NA or deleted.

The dataset may contain additional columns, e.g. the child number or health information. These are ignored by the D-score calculation.

The most important steps in preparing the data for the D-score calculations are:
- rename the original variable names into the 9-position GSED item names;
- recode all item responses as 0, 1 or NA.

GSED 9-position item names

The `dscore()` function accepts item names that follow the GSED 9-position schema. A name with a length of nine characters identifies every milestone. T Table 1 shows the construction of names.

TABLE 1. CONSTRUCTION OF ITEM NAMES

Position	Description	Example
1-3	measure	`gs1`
4-5	developmental domain	`mo`
6	administration mode	`c`
7-9	item number	`018`

Thus, item `gs1moc018` refers to the 18th item in GSED SF and measures motor development through caregiver reports. The label of the item can be obtained by:

```
library(dscore)
get_labels("gs1moc018")

##
gs1moc018
## "While your child is on his/her back, can he/she bring his/her hands together?"
```

The dscore package maintains a list of item names.

GSED measures

Table 2 lists two GSED measures.

TABLE 2. AVAILABLE GSED MEASURES

Measure name	Measure code	Length	Status
GSED SF	gs1	139	Active
GSED LF	gl1	155	Active

Select the section corresponding to the measure for further instructions.

GSED SF

Check

The GSED SF v1.0 contains 139 items and has measure code gs1.
The full list of item names for GSED SF may be obtained as:

```
instrument <- "gs1"
items <- get_itemnames(instrument = instrument, order = "indm")
length(items)
## [1] 139
head(items)
## [1] "gs1sec001" "gs1moc002" "gs1sec003" "gs1lgc004" "gs1moc005" "gs1cgc006"
```

The order argument is needed to sort items according to sequence number 1 to 139. Check for the correct version by comparing the labels of the first few items as:

```
labels <- get_labels(items)
head(cbind(items, substr(labels, 1, 50)))
##           items
## gs1sec001 "gs1sec001" "Does your child smile?"
## gs1moc002 "gs1moc002" "When lying on his/her back, does your child move h"
## gs1sec003 "gs1sec003" "Does your child look at your face when you speak t"
## gs1lgc004 "gs1lgc004" "Does your child cry when he/she is hungry, wet, ti"
## gs1moc005 "gs1moc005" "Does your child grasp your finger if you touch her"
## gs1cgc006 "gs1cgc006" "Does your child look at and focus on objects in fr"
```

Rename

For example, data are stored with item names **sf001** to **sf139**:

```
sf <- dscore::sample_sf
head(sf[, c(1:2, 101:105)])
##   subjid agedays sf099 sf100 sf101 sf102 sf103
## 1      1     811     1     1     1     1     1
## 2      2     898     1     1     1     1     1
## 3      3     203    NA    NA    NA    NA    NA
## 4      4     966    NA    NA    NA     1    NA
## 5      8     770     1     1     1     0     1
## 6      9     306    NA    NA    NA    NA    NA
```

The items should be in the correct order, and then the columns renamed with gsed 9-position item names.

```
colnames(sf)[3:141] <- items
head(sf[, c(1:2, 101:105)])
##   subjid agedays gs1lgc099 gs1lgc100 gs1moc101 gs1sec102 gs1lic103
## 1      1     811         1         1         1         1         1
## 2      2     898         1         1         1         1         1
## 3      3     203        NA        NA        NA        NA        NA
## 4      4     966        NA        NA        NA         1        NA
## 5      8     770         1         1         1         0         1
## 6      9     306        NA        NA        NA        NA        NA
```

The data in sf are now ready for the **dscore()** function.

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Calculate D-score and DAZ

Once the data are in proper shape, calculation of the D-score is straightforward. The sf dataset has properly named columns that identify each item.

```
results <- dscore(sf, xname = "agedays", xunit = "days")
head(results)
##       a  n     p    d   sem    daz
## 1 2.220 29 0.759 64.8 0.644 -0.540
## 2 2.459 39 0.692 67.1 0.649 -0.515
## 3 0.556 49 0.653 38.4 0.942  1.055
## 4 2.645 36 0.750 73.2 0.656  0.828
## 5 2.108 50 0.500 65.5 0.615 -0.011
## 6 0.838 49 0.694 41.6 0.969 -0.595
```

Table 3 provides the interpretation of the output.

TABLE 3. INTERPRETATION OF D-SCORE OUTPUT

Name	Interpretation
a	Decimal age in years
n	Number of items used to calculate the D-score
p	Proportion of passed milestones
d	D-score (posterior mean)
sem	Standard error of measurement (posterior standard deviation)
daz	D-score corrected for age

The number of rows of result is equal to the number of rows of sf. The result is saved for later processing.

```
sf2 <- data.frame(sf, results)
```

It is possible to calculate the D-score for item subsets by setting the items argument. This option is not for practical application, but for situations where, for example, the D-score is wanted based on items from gs1 for domains mo (motor) only. The "motor" D-score can be calculated as follows:

```
items_motor <- get_itemnames(instrument = "gs1", domain = "mo")
results <- dscore(sf, items = items_motor, xname = "agedays", xunit = "days")
head(results)
##       a  n     p    d  sem    daz
## 1 2.220  6 0.833 63.4 1.71 -0.908
## 2 2.459  8 0.750 66.7 1.85 -0.638
## 3 0.556 30 0.733 39.5 1.08  1.365
## 4 2.645  5 0.800 75.1 1.49  1.384
## 5 2.108 10 0.700 69.6 1.79  1.178
## 6 0.838 31 0.742 41.2 1.13 -0.702
```

Analyse, plot

The GSED Round 1 data were used to calculate age-conditional reference scores for the D-score. The references are based on about 12 000 administrations of the GSED SF and GSED LF from Bangladesh, Pakistan and the United Republic of Tanzania. The references should be extracted as:

```
library(dplyr, warn.conflicts = FALSE, quietly = TRUE)
ref <- builtin_references %>%
  filter(pop == "phase1") %>%
  select(pop, age, mu, sigma, nu, tau, SDM2, SD0, SDP2)
head(ref)
##      pop    age   mu sigma   nu  tau SDM2  SD0 SDP2
## 1 phase1 0.0383 13.7 0.246 1.17 15.4 6.04 13.7 20.7
## 2 phase1 0.0575 14.4 0.232 1.21 15.5 6.70 14.4 21.3
## 3 phase1 0.0767 15.0 0.221 1.24 15.7 7.35 15.0 21.9
## 4 phase1 0.0958 15.7 0.210 1.27 15.8 8.01 15.7 22.5
## 5 phase1 0.1150 16.4 0.201 1.30 15.9 8.68 16.4 23.1
## 6 phase1 0.1342 17.0 0.192 1.32 16.0 9.36 17.0 23.7
```

The columns **mu, sigma, nu** and **tau** are the age-varying parameters of a Box-Cox *t* (BCT) distribution.

The script below creates a figure with -2SD, 0SD and +2SD centiles plus 10 D-scores (10 SF) for the **sf2** data (see Figure 1).

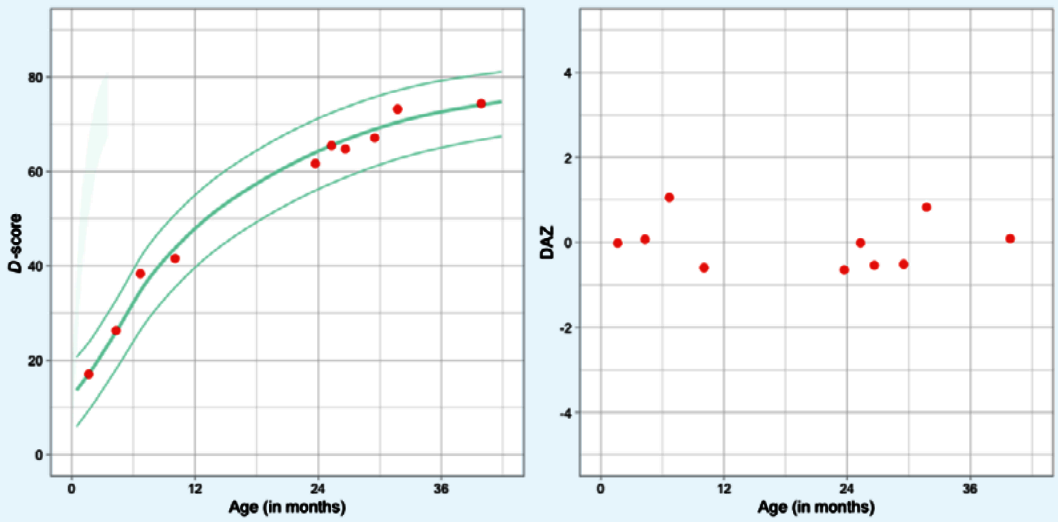
```
library(ggplot2)
library(patchwork)

r <- builtin_references %>%
  filter(pop == "phase1" & age <= 3.5) %>%
  mutate(m = age * 12)

sf2$ins <- "sf"; sf2$m <- sf2$a * 12
data <- sf2
g1 <- ggplot(data, aes(x = m, y = d, group = ins, color = ins)) +
  theme_light() +
  annotate("polygon", x = c(r$age, rev(r$age)),
           y = c(r$SDM2, rev(r$SDP2)), alpha = 0.06, fill = "#C5EDDE") +
  annotate("line", x = r$m, y = r$SDM2, lwd = 0.5, color = "#C5EDDE") +
  annotate("line", x = r$m, y = r$SDP2, lwd = 0.5, color = "#C5EDDE") +
  annotate("line", x = r$m, y = r$SD0, lwd = 1, color = "#C5EDDE") +
  scale_x_continuous("Age (in months)",
                     limits = c(0, 42),
                     breaks = seq(0, 42, 12)) +
```

```
  scale_y_continuous(
    expression(paste(italic(D), "-score", sep = "")),
    breaks = seq(0, 80, 20),
    limits = c(0, 90)) +
  geom_point(size = 2) +
  theme(legend.position = "none")
g2 <- ggplot(data, aes(x = m, y = daz, group = ins, color = ins)) +
  theme_light() +
  scale_x_continuous("Age (in months)",
                     limits = c(0, 42),
                     breaks = seq(0, 42, 12)) +
  scale_y_continuous(
    "DAZ",
    breaks = seq(-4, 4, 2),
    limits = c(-5, 5)) +
  geom_point(size = 2) +
  theme(legend.position = "none")
g1 + g2
```

FIGURE 1. D-SCORE AND DAZ



GSED LF

Check

The GSED LF v1.0 contains 155 items and has instrument code gl1.
The full list of item names for GSED LF may be obtained as:

```
instrument <- "gl1"
items <- get_itemnames(instrument = instrument)
length(items)
## [1] 155
head(items)
## [1] "gl1fmd001" "gl1fmd002" "gl1fmd003" "gl1fmd004" "gl1fmd005" "gl1fmd006"
```

Item names should be reordered so that they correspond to Streams A, B and C, respectively.

```
items <- items[c(55:155, 1:54)]
head(items)
## [1] "gl1gmd001" "gl1gmd002" "gl1gmd003" "gl1gmd004" "gl1gmd005" "gl1gmd006"
```

To ensure the correct version is being used, the labels of the first few items may be compared as:

```
labels <- get_labels(items)
head(cbind(items, substr(labels, 1, 50)))
##           items
## gl1gmd001 "gl1gmd001" "Moves body in reaction to caregiver"
## gl1gmd002 "gl1gmd002" "Moves body, kicking legs and moving arms equally o"
## gl1gmd003 "gl1gmd003" "Pulls to sit - no head lag"
## gl1gmd004 "gl1gmd004" "Lifts head in prone 45 degrees"
## gl1gmd005 "gl1gmd005" "Lifts head, shoulders, chest when prone (2X)"
## gl1gmd006 "gl1gmd006" "Puts hands together in front of face"
```

Rename

Suppose that the data were stored with items names lf001 to lf155. For example,

```
lf <- dscore::sample_lf
head(lf[, c(1:2, 60:64)])
##   subjid agedays lf058 lf059 lf060 lf061 lf062
## 1      1     811    NA    NA    NA    NA    NA
## 2      2     898    NA    NA    NA    NA    NA
## 3      3     203     0     0     0    NA    NA
## 4      4     966    NA    NA    NA    NA    NA
## 5      8     770     0     0     0     0     0
## 6      9     306     1     1     0     1     0
```

The correct order of the items should be verified. The columns with gsed 9-position item names should be renamed.

```
colnames(lf)[3:157] <- items
head(lf[, c(1:2, 60:64)])
##   subjid agedays gl1lgd009 gl1lgd010 gl1lgd011 gl1lgd012 gl1lgd013
## 1      1     811         NA         NA         NA         NA         NA
## 2      2     898         NA         NA         NA         NA         NA
## 3      3     203          0          0          0         NA         NA
## 4      4     966         NA         NA         NA         NA         NA
## 5      8     770          0          0          0          0          0
## 6      9     306          1          1          0          1          0
```

The data in lf are now ready for the dscore() function.

Calculate D-score and DAZ

Once the data are in correct shape, calculation of the D-score is straightforward. The lf dataset has properly named columns that identify each item.

```
results <- dscore(lf, xname = "agedays", xunit = "days")
head(results)
##       a  n     p    d   sem    daz
## 1 2.220 45 0.556 67.1 0.587  0.117
## 2 2.459 53 0.623 70.7 0.548  0.504
## 3 0.556 34 0.559 34.1 0.841 -0.150
## 4 2.645 54 0.518 70.8 0.524  0.103
## 5 2.108 58 0.172 37.5 1.169 -4.444
## 6 0.838 32 0.562 44.4 0.757  0.174
```

Table 4 provides the interpretation of the output.

TABLE 4. INTERPRETATION OF D-SCORE OUTPUT

Name	Interpretation
`a`	Decimal age in years
`n`	Number of items used to calculate the D-score
`p`	Proportion of passed milestones
`d`	D-score (posterior mean)
`sem`	Standard error of measurement (posterior standard deviation)
`daz`	D-score corrected for age

The number of rows of result is equal to the number of rows of `lf`. The result should be saved for later processing.

```
lf2 <- data.frame(lf, results)
```

It is possible to calculate D-score for item subsets by setting the items argument. This option is not promoted for practical application, but may be used if interested in the D-score based on items from gl1 for domains gm (motor) only. The "motor" D-score can be calculated as follows:

```
items_motor <- get_itemnames(instrument = "gl1", domain = "gm")
results <- dscore(lf, items = items_motor, xname = "agedays", xunit = "days")
head(results)
##       a  n     p    d   sem    daz
## 1 2.220 12 0.583 65.2 2.325 -0.419
## 2 2.459 18 0.611 71.3 0.918  0.692
## 3 0.556 19 0.684 35.8 1.000  0.325
## 4 2.645 12 0.417 65.9 2.193 -1.248
## 5 2.108 12 0.500 56.4 1.683 -2.217
## 6 0.838 14 0.714 43.1 1.417 -0.187
```

Analyse, plot

The GSED Round 1 data were used to calculate age-conditional reference scores for the D-score. The references are based on about 12 000 administrations of the GSED SF and GSED LF from Bangladesh, Pakistan and the United Republic of Tanzania. Extract the references as:

```
library(dplyr, warn.conflicts = FALSE, quietly = TRUE)
ref <- builtin_references %>%
  filter(pop == "phase1") %>%
  select(pop, age, mu, sigma, nu, tau, SDM2, SD0, SDP2)
head(ref)
##       pop    age   mu sigma   nu  tau SDM2  SD0 SDP2
## 1 phase1 0.0383 13.7 0.246 1.17 15.4 6.04 13.7 20.7
## 2 phase1 0.0575 14.4 0.232 1.21 15.5 6.70 14.4 21.3
## 3 phase1 0.0767 15.0 0.221 1.24 15.7 7.35 15.0 21.9
## 4 phase1 0.0958 15.7 0.210 1.27 15.8 8.01 15.7 22.5
## 5 phase1 0.1150 16.4 0.201 1.30 15.9 8.68 16.4 23.1
## 6 phase1 0.1342 17.0 0.192 1.32 16.0 9.36 17.0 23.7
```

The columns mu, sigma, nu and tau are the age-varying parameters of a Box-Cox t (BCT) distribution.

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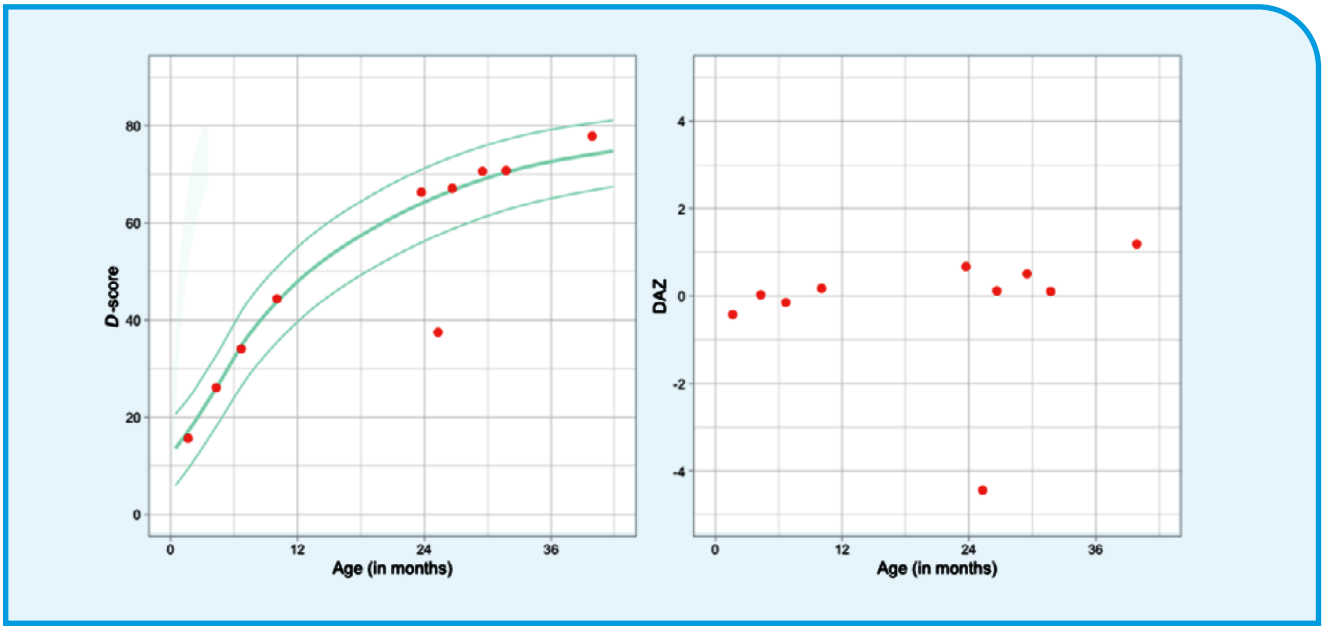
The script below creates a figure with -2 SD, 0 SD and +2 SD centiles plus 10 D-scores (10 LF) for the lf2 data (see Figure 2).

```
library(ggplot2)
library(patchwork)

r <- builtin_references %>%
  filter(pop == "phase1" & age <= 3.5) %>%
  mutate(m = age * 12)

lf2$ins <- "lf"; lf2$m <- lf2$a * 12
data <- lf2
g1 <- ggplot(data, aes(x = m, y = d, group = ins, color = ins)) +
  theme_light() +
  annotate("polygon", x = c(r$age, rev(r$age)),
           y = c(r$SDM2, rev(r$SDP2)), alpha = 0.06, fill = "#C5EDDE") +
  annotate("line", x = r$m, y = r$SDM2, lwd = 0.5, color = "#C5EDDE") +
  annotate("line", x = r$m, y = r$SDP2, lwd = 0.5, color = "#C5EDDE") +
  annotate("line", x = r$m, y = r$SD0, lwd = 1, color = "#C5EDDE") +
  scale_x_continuous("Age (in months)",
                     limits = c(0, 42),
                     breaks = seq(0, 42, 12)) +
  scale_y_continuous(
    expression(paste(italic(D), "-score", sep = "")),
    breaks = seq(0, 80, 20),
    limits = c(0, 90)) +
  geom_point(size = 2) +
  theme(legend.position = "none")
g2 <- ggplot(data, aes(x = m, y = daz, group = ins, color = ins)) +
  theme_light() +
  scale_x_continuous("Age (in months)",
                     limits = c(0, 42),
                     breaks = seq(0, 42, 12)) +
  scale_y_continuous(
    "DAZ",
    breaks = seq(-4, 4, 2),
    limits = c(-5, 5)) +
  geom_point(size = 2) +
  theme(legend.position = "none")
g1 + g2
```

FIGURE 2. D-SCORE AND DAZ



GSED SF + LF combined

For calculating one D-score for the GSED SF and GSED LF combined define items as:

```
items_sf <- get_itemnames(instrument = "gs1", order = "indm")
items_lf <- get_itemnames(instrument = "gl1")
items <- c(items_sf, items_lf)
```

and proceed in the same way.

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