

## Introduction to `psyquest`

# Deploying psychosocial and music-related questionnaires for data collection in R

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## About `psyquest`

`psyquest` is an R package that contains a set of standard psychosocial and music-related questionnaires. `psyquest` is related to `psychTestR`, an R package for developing and administering behavioural experiments and for creating their interfaces (see the `psychTestR` website<sup>1</sup>, the introduction<sup>2</sup> or Harrison, 2020, for further details). `psyquest` questionnaires are implemented as `psychTestR` modules within Shiny, a web development framework. Like a library of certain `psychTestR` modules, `psyquest` in turn provides questionnaires to fill these interfaces.

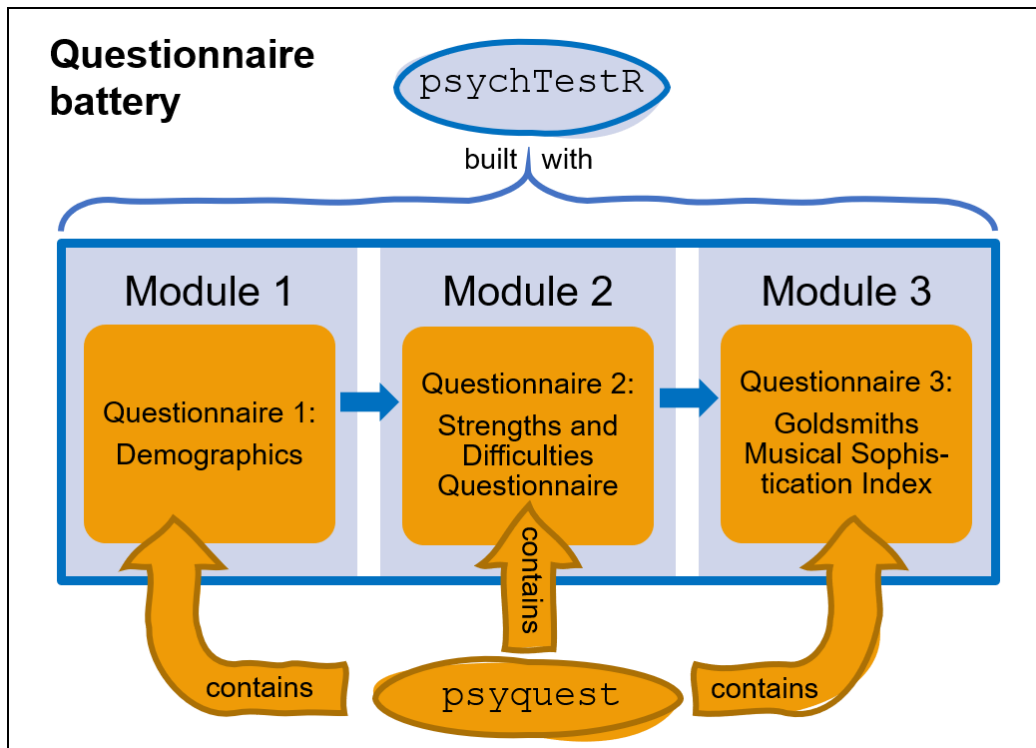


Figure 1. Schematic structure of an example questionnaire battery built with `psychTestR` (blue) filled with questionnaires of the `psyquest` library (orange).

Consequently, `psyquest` can be applied effectively in both laboratory settings and large-scale online surveys<sup>3</sup> (Harrison, 2020). This introduction assumes that the reader is already moderately familiar with the programming language R.

<sup>1</sup> <https://pmcharrison.github.io/psychTestR/index.html>

<sup>2</sup> <https://pmcharrison.github.io/psychTestR/articles/b-introduction>

<sup>3</sup> This document describes the use on a local computer. For setting up a server running `psyquest`, refer to [Anthony Chmiel's Guide to creating a server for online R experiments using psychTestR](#).

The package was developed by the *LongGold* team for investigating the development of musicality in children and adolescents (see [longgold.org](https://longgold.org) for further information). All questionnaires included in `psyquest`, as well as performance and listening tests used in the *LongGold* project, are provided at [https://shiny.goldmsi.org/longgold\\_demo/](https://shiny.goldmsi.org/longgold_demo/). English and German versions of the questionnaires are included<sup>4</sup>. [Table 1](#) shows the questionnaires supplied by `psyquest`. They cover a range of self-reports on psychosocial factors, musical factors and other activities relevant to the musical developmental research: Besides the collection of data on basic demographic variables (DEG) and socio-economic status (SES), it is possible to quantify drama- (DAC) and sports-related activities (PAC) as well as musical activity (i) at home (including parental support for it; MHE), (ii) in general, and (iii) at and after school (CCM, MHE). To assess general musicality, `psyquest` provides the *Goldsmiths Musical Sophistication Index* (Müllensiefen et al., 2014; GMS). Attitudes towards (i) musicality (TOM), (ii) intelligence (TOI), and (iii) towards a participant's school engagement (SEM) can be evaluated. Furthermore, with `psyquest`, behavioural difficulties and strengths (SDQ), certain personality traits (TPI), the handling of goals (GRT, HOP), and the motivation during testing (SOS) can be assessed.

The questionnaires employed in the *LongGold* research are targeted at children and adolescents. Therefore, most questionnaires have been adapted to this specific group (see Table 1). Nonetheless, most of them can also be used for an adult target group. We recommend considering the exact wording of the items and checking if they are suitable for an adult audience prior to any official use.

## Installation

If you don't have R installed yet, download<sup>5</sup> and install it first. To install `psyquest`, the package `devtools` and an integrated development environment for R (e.g.

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<sup>4</sup> in line with the internationalisation paradigm of `psychTestR`, whereby experiments are implemented with reference to a multilingual dictionary, see <https://pmcharrison.github.io/psychTestR/articles/b-introduction#internationalisation-1>.

<sup>5</sup> <https://cloud.r-project.org/>

RStudio<sup>6</sup>) are required. Make sure the R user packages on your system are up to date. Use the command `devtools::install_github('fmhoegeer/psyquest')` within the R console to download and install the files needed.

If some packages have more recent versions available, you will be asked which of them you want to update. Press “1” to update all (recommended) or “3” to update none of them. During this process, you might have to install from sources packages which need compilation: If the message: “Do you want to install from sources the packages which need compilation?” appears, click “Yes”. If the installation failed because prior installation of any specific package couldn’t be removed, try to install these packages separately.

The message `* DONE (psyquest)` in the console indicates that the installation was successful. After loading the `psyquest` package with the command `library(psyquest)`, `psyquest` is ready for use.

```
devtools::install_github('fmhoegeer/psyquest')  
library(psyquest)
```

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<sup>6</sup> <https://rstudio.com/>

## Usage

### Single questionnaire

The questionnaires are implemented as functions with several arguments to specify some of their properties:

`XYZ_standalone()`: To run a particular questionnaire use the command `XYZ_standalone()`, replacing `XYZ` with its respective three-letter acronym (see Table 1; e.g. `GMS_standalone()`). The questionnaire opens in an inbuilt browser window and begins with a page to enter a participant's ID. Before this, arguments can be specified within the parentheses of the command.

`admin_password`: It is recommended to set a password via `XYZ_standalone(admin_password = "your-password")` to access the admin panel of `psychTestR` where, among other things, the results can be downloaded (see section "Example" or "Admin panel" of the introductory article on the `psychTestR` website<sup>7</sup> for further details)

`languages`: The argument `languages = "de"` starts the German version of a questionnaire, while `"en"`, which is the default, starts the English one.

`researcher_email`: The argument `researcher_email` displays a contact email address for problems at the bottom of the questionnaires.

`subscales`: As can be seen in Table 1, some of the questionnaires have subscales (e.g. the *Strengths and Difficulties Questionnaire*, or SDQ for short). Subscales to be included in the questionnaire can be specified in the character vector of the `subscales` argument, e.g.

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<sup>7</sup> <https://pmcharrison.github.io/psychTestR/articles/b-introduction>

```
SDQ_standalone(subscales = c("Prosocial",
                              "Hyperactivity", "Emotional problems"))
```

You can find the exact spelling of the values for the `subscales` argument and other general information about each questionnaire by entering `? XYZ_standalone` into the console. Note that the subscales of certain questionnaires (e.g. *GMS General* and *Singing Abilities*) have a few items in common.

`short_version:` Besides the subscales, *GMS* has a short version comprising 29 items (instead of 41) which can be accessed with `short_version = TRUE`. This setting is overridden by the `subscales` argument, i.e. combining `subscales` and `short_version` results in a questionnaire consisting of subscales still in their original, normal length. However, if you want to include short versions of the subscales, you can use the so called *GMSI Configurator* (see section “*GMSI Configurator*”) to customize a *GMS* self-report inventory by specifying a certain number of items and the language version.

### Battery of several questionnaires

To bundle several questionnaires together the `battery()` function can be used. As in the case of a single questionnaire, the arguments `admin_password`, `languages`, and `researcher_email` and the following arguments can be used:

`title:` The argument `title` exchanges the headline of the questionnaires with the given character vector (e.g. `title = "LongGold Survey 2020"`).

`questionnaires:` Questionnaires to be included in the battery have to be specified in the argument `questionnaires` with their three-letter acronym followed by parentheses, e.g.

```
battery(questionnaires = c(DEG(), GMS()))
```

`subscales &  
short_version:`

The arguments `subscales` and `short_version` can be defined within the parentheses of single questionnaires (see section “Example”).

### Downloading the results and admin panel

The results of completed questionnaires of a battery of questionnaires can be found in the `*.RDS` files saved in the directory of the R project or the default directory within the folder `output/results`<sup>8</sup>. All results or only the result of the current session can also be downloaded as a comma-separated values file (`*.csv`) or a single R object (`*.RDS`) via the admin panel. Both the `*.csv` and the `*.RDS` files contain all answers given by the participant as well as the subscale scores calculated from them. To login to the admin panel, click the “Admin login”-button at the bottom and enter the specified password. Each `*.RDS` file represents a participant session and can be opened with *RStudio* by loading it into a new R object. The different components are shown in the data viewer on the top left (as shown in [Figure 3](#)).

For more information about the interface to the “back end” of the testing environment, which is provided in the admin panel (an interface to the “back end” of the testing environment (piloting, availability, statistics), can be found at <https://pmcharrison.github.io/psychTestR/articles/b-introduction#admin-panel-1>.

### GMSI Configurator

Visit <https://shiny.gold-msi.org/gmsiconfigurator/> to choose a certain number of items which you want to include in a shorter version of the GMS questionnaire: Click on the tab “Configure” to set the number of items of each subscale to be included. Additionally, you can select the language of the items (English, German, and Traditional Chinese<sup>10</sup>). Click on the download button to download a `*.csv` file including the selected items. Include these items into your questionnaire via the `configuration_filepath` argument (see Example 3 in the next section). NB. This argument overrides the `short_version` and `subscales` arguments.

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<sup>8</sup> for Windows, `output/results` for MAC and Linux

<sup>10</sup> more languages coming soon



Table 1 Questionnaires included in psyquest

Questionnaire	Acronym	Measured construct(s) or variable(s) [total number of items]	Target group	Subscales (number of Items)	Value range	Source
Concurrent Musical Activities	CCM	Type and intensity of current musical activities, number of music lessons [5]	Children & adolescents	General (3), Extra (2)	General: [-2.55, 8.71], Extra: [1, 5]	Müllensiefen et al., 2015
Drama Activity	DAC	Quantitative investigation of drama activity (i.e. theatre, improvisation, and role play) [4]	Children & adolescents	-	[1, 5]	Modelled after: Kent C. Kowal-ski et al., 1997; K. C. Kowalski et al., 2004
Demographics	DEG	Hearing impairment, gender, age, nationality, languages, and handedness [12]	Children, adolescents, & adults	-	-	-

Questionnaire	Acronym	Measured construct(s) or variable(s) [total number of items]	Target group	Subscales (number of Items)	Value range	Source
Goldsmiths Musical Sophistication Index	GMS	Musical sophistication (musical abilities, skills, and music-related behaviour) [41/short version: 29]	Children, adolescents, & adults	General (18), Active Engagement (9), Emotions (6), Musical Training (7), Perceptual Abilities (9), Singing Abilities (7), Start Age (1), Instrument (1), Absolute Pitch (1)	[1, 7]	Müllensiefen et al., 2014
Short Grit Scale	GRT	Trait-level perseverance and passion for long-term goals [8]	Children, adolescents, & adults	-	[1, 5]	Duckworth & Quinn, 2009

Questionnaire	Acronym	Measured construct(s) or variable(s) [total number of items]	Target group	Subscales (number of Items)	Value range	Source
Children's Hope Scale	HOP	Hope reflecting the combination of agentic and pathways thinking towards goals [6]	Children & adolescents	-	[1, 5]	Snyder et al., 1997
Musical Home Environment	MHE	Degree of musical activities within the home environment, parental support for musical and school activities [9]	Children & adolescents	-	[-3.23, 4.04]	Müllensiefen et al., 2015
Physical Activity	PAC	Amount of sporting and physical activities [5]	Children & adolescents	-	[1, 5]	Kent C. Kowalski et al., 1997; K. C. Ko-walski et al., 2004

Questionnaire	Acronym	Measured construct(s) or variable(s) [total number of items]	Target group	Subscales (number of Items)	Value range	Source
Strengths and Difficulties Questionnaire (mental health)	SDQ	Behavioural difficulties and strengths [25]	Children & adolescents	Prosocial (5), Hyperactivity (5), Emotional problems (5), Conduct problems (5), Peer problems (5), Externalising (10), Internalising (10), Difficulties (20)	[0, 2]	Goodman et al., 1998

Questionnaire	Acronym	Measured construct(s) or variable(s) [total number of items]	Target group	Subscales (number of Items)	Value range	Source
School Engagement Measurement	SEM	Commitment and attitudes of pupils towards their school [23]	Children & adolescents	Attentiveness (3), School Compliance (4), Valuing of School Education (5), Self-regulated Learning(4), Cognitive Strategy Use (4), Behavioral Engagement (7), Emotional Engagement (8), Cognitive Engagement (8), School belonging (3)	[1, 5]	Wang et al., 2011

Questionnaire	Acronym	Measured construct(s) or variable(s) [total number of items]	Target group	Subscales (number of Items)	Value range	Source
Socio-economic Status	SES	Educational level of the parents, professional activity of the main income earner [5]	Children & adolescents	Educational Degree (2), ESeC (2-3)	Educational Degree: [1, 6], ESeC [1, 5]	Rose, 2005; Rose & Pevalin, 2001
Student Opinion Scale	SOS	Motivation concerning the answering of questionnaires and tests [10]	Children, adolescents, & adults	Importance (5), Effort (5)	[1, 5]	Sundre & Moore, 2002
Theory of Intelligence	TOI	Attitudes regarding intelligence as something static and unchangeable (entity view) or as something fluid and changeable (incremental view) [7]	Children, adolescents, & adults	Goals Choice (4), Theory of Intelligence (3)	Goals Choice: [1.75, 5.25], Theory of Intelligence: [1, 6]	Dweck, 2000

Questionnaire	Acronym	Measured construct(s) or variable(s) [total number of items]	Target group	Subscales (number of Items)	Value range	Source
Theory of Musicality	TOM	Attitudes about musical abilities (acquired or innate) [12]	Children, adolescents, & adults	Entity (6), Gift (3), Improvement (3), Incremental (6), Learning (3), Stable (3)	[1, 5]	Modelled after: Biddle et al., 2003
Ten Item Personality Inventory	TPI	Personality on the big five personality dimensions [10]	Children, adolescents, & adults	Extraversion (2), Agreeableness (2), Conscientiousness (2), Emotional Stability (2), Openness to Experiences (2)	[1, 7]	Gosling et al., 2003

## Example: How to create your first survey and access the results

### Example 1: Battery of several questionnaires

Imagine, in a survey called “Music and Personality 2021”, you would like to investigate whether people who spend a lot of time engaging in music and consider themselves a good singer are more likely to be sociable, curious, lively, and open. Subsequently, you can use the following code to start a questionnaire including questions about demographics (DEG), prosocial behaviour (SDQ’s subscale *Prosocial*), active musical engagement (GMS’s subscale *Active Engagement*), singing abilities (GMS’s subscale *Singing Abilities*), and extraversion and openness to experiences (TPI’s subscales *Extraversion* and *Openness to Experiences*). The language is set to German and “hello@gmail.com” should be contacted in case of problems.

```
if(!require(psyquest)){
  devtools::install_github("fmhoeger/psyquest");
  library(psyquest)
}else{
  library(psyquest)
}

battery(
  questionnaires = c(DEG(),
    SDQ(subscales = c("Prosocial")),
    GMS(subscales = c("Active Engagement", "Singing Abilities")),
    TPI(subscales = c("Extraversion", "Openness to Experiences"))),
  title = "Music and Personality 2021", languages = "de",
  researcher_email = "hello@gmail.com", admin_password = "abcde")
```

Entering this code into the console of e.g. *RStudio* will open a window in which the questionnaire starts by prompting participants to enter their ID (see Figure 2).



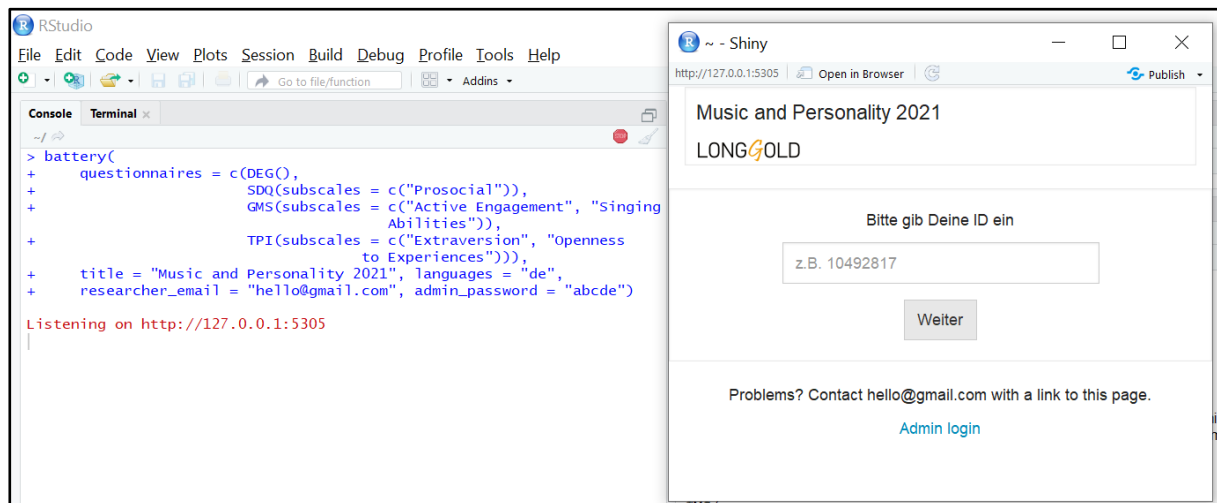


Figure 2 Start page

### Example 2: Including GMSI Configurator file

Normally, the GMS subscales *Active Engagement* and *Singing Abilities* consist of nine and seven items, respectively. If you need shorter versions, you can use the GMSI Configurator<sup>11</sup> to create a list containing a reduced number of items, e.g. with five items about active musical engagement and singing abilities, respectively. Suppose you saved it in e.g. *GMSI\_items.csv* in *C:/Users/user/Documents*. Subsequently, you can use the following code to start a questionnaire including questions about demographics (DEG), prosocial behaviour (SDQ's subscale *Prosocial*), five items concerning active musical engagement (GMS's subscale *Active Engagement*), five items about singing abilities (GMS's subscale *Singing Abilities*), and items measuring a participant's extraversion and openness to experiences (TPI's subscales *Extraversion* and *Openness to Experiences*). The language is set to German and "hello@gmail.com" should be contacted in case of problems.

Entering the following code into the console of e.g. *RStudio* (Make sure to replace "user" with your username within the file path!) will open a window in which the questionnaire starts by prompting participants to enter their ID.

<sup>11</sup> <https://shiny.gold-msi.org/gmsiconfigurator/>

```
if(!require(psyquest)){
  devtools::install_github("fmhoefer/psyquest");
  library(psyquest)
}else{
  library(psyquest)
}

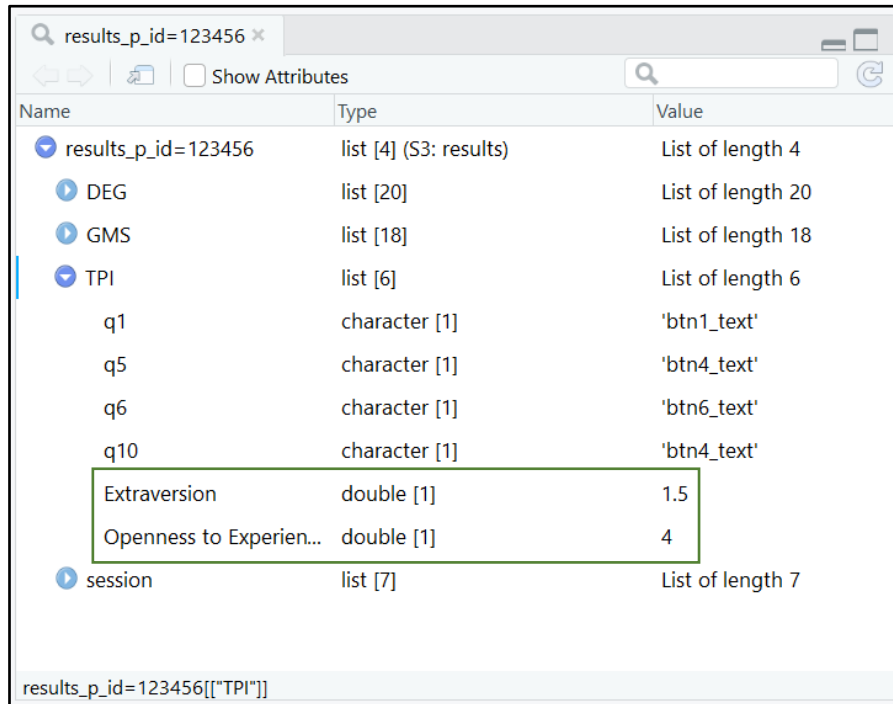
battery(
  questionnaires = c(DEG(),
    SDQ(subscales = c("Prosocial")),
    GMS(configuration_filepath = "/Users/user/Documents/GMSI_items.csv"),
    TPI(subscales = c("Extraversion", "Openness to Experiences"))),
  title = "Music and Personality 2021", languages = "de",
  researcher_email = "hello@gmail.com", admin_password = "abcde")
```

### Example 3: Retrieving the results

After completing all questions, find the results in an `*.RDS` file at folder `output/results`<sup>12</sup> or click the “Admin login”-button at the bottom and enter the password “abcde”. Click “All (CSV)” to download the results of all sessions and open them e.g. in *Excel*. Click “All (RDS)” to download a folder with all results of all sessions. In this folder, there are `*.RDS` files, each file representing a participant session. They are called e.g. “id=1&p\_id=123456&save\_id=2&pilot=false&complete=true”. Open it with *RStudio* by loading it into a new R object called e.g. `results_p_id=123456`. Enter `View(`results_p_id=123456`)` into the R console, so the different components of `results_p_id=123456` are shown in the data viewer on the top left (as shown in Figure 3). Click the blue button next to TPI to view the given answers, e.g. in the second line, `q5` and `'btn4_text'` mean that the participant chose button 4 in question 5 of the total TPI scale inventory. `q1`, `q5`, `q6`, and `q10` represent the two chosen subscales. The total scores for variables *Extraversion* and *Openness to Experiences* is viewed below (1.5 and 4, respectively, green box).

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<sup>12</sup> for Windows, `output/results` for MAC and Linux



results\_p\_id=123456 x

Show Attributes

Name	Type	Value
results_p_id=123456	list [4] (S3: results)	List of length 4
DEG	list [20]	List of length 20
GMS	list [18]	List of length 18
TPI	list [6]	List of length 6
q1	character [1]	'btn1_text'
q5	character [1]	'btn4_text'
q6	character [1]	'btn6_text'
q10	character [1]	'btn4_text'
Extraversion	double [1]	1.5
Openness to Experienc...	double [1]	4
session	list [7]	List of length 7

results\_p\_id=123456[["TPI"]]

Figure 3. Data viewer

## Benchmark data

Most of the questionnaires included in `psyquest` have already been used in the *LongGold* project. To generate benchmark values from the project's data, the total sample was split into groups of the same age and gender. Participants who had been tested in two or more test waves, and therefore would have been listed in multiple groups, were removed from all groups except the one in which they had their highest age. For all groups with at least 50 participants who completed a questionnaire, mean scores ( $M$ ) and standard deviations ( $SD$ ) for that questionnaire were calculated. Table 2 shows these values, the sample size of the group for each questionnaire, and the gender  $\times$  age group combination meeting the above condition. With these values, users of the questionnaires included in `psyquest` can transform the scores  $x_i$  of their participants into standardized scores (i.e. z-scores using the formula  $z = \frac{x_i - M}{SD}$  or IQ-like scores). To access these benchmarks via R as a data frame enter `benchmarks` into the R console.

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## Appendix

Table 2 Benchmark values from the *LongGold* project

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
CCM	General	female	10	0.811	1.96	295
			11	0.550	2.16	443
			12	0.746	2.19	519
			13	0.570	2.14	252
			14	0.165	2.42	262
			15	-0.264	2.38	141
			16	-0.155	2.42	179
			17	-0.420	2.09	184
		male	10	0.133	1.98	265
			11	0.0508	2.05	375
			12	-0.00141	2.21	334
			13	-0.245	2.22	157
			14	-0.831	2.13	183
			15	-1.09	1.97	59
CCM	Extra: weekly number of school music lessons	female	10	2.81	1.00	294
			11	2.77	1.06	440
			12	2.82	1.19	500
			13	2.72	1.24	212
			14	2.34	1.31	190
			15	1.78	1.27	114
			16	1.81	1.32	122
			17	1.60	1.15	83
		male	10	2.87	1.03	265
			11	2.86	1.04	375
			12	2.63	1.18	326
			13	2.72	1.12	137
			14	1.57	1.07	83
			15	1.57	1.23	58
CCM	Extra: weekly number of after school music lessons	female	10	1.65	1.08	294
			11	1.56	1.03	440
			12	1.66	1.11	500
			13	1.73	1.09	212

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
		male	14	1.81	1.26	190
			15	1.54	1.03	114
			16	1.65	1.15	122
			17	1.51	1.11	83
			10	1.53	1.06	265
			11	1.44	0.973	375
			12	1.52	1.01	326
			13	1.60	1.17	137
			14	1.30	0.777	83
			15	1.52	1.14	58
		female	10	1.41	0.653	222
			11	1.44	0.674	348
			12	1.54	0.777	444
			13	1.49	0.767	210
			14	1.56	0.819	226
			15	1.41	0.648	133
			16	1.48	0.779	156
			17	1.30	0.647	158
		male	10	1.20	0.474	225
			11	1.24	0.570	327
			12	1.22	0.521	291
			13	1.49	0.891	140
			14	1.38	0.808	170
GMS	General	female	10	3.99	0.856	254
			11	3.90	0.855	405
			12	3.95	0.877	486
			13	3.82	0.843	239
			14	3.73	1.00	248
			15	3.80	0.911	137
			16	3.96	1.01	175
		male	17	3.82	0.996	185
			10	3.55	0.921	240
			11	3.53	0.867	354
			12	3.55	0.896	317
			13	3.53	0.958	154
			14	3.45	0.994	174



Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
GMS	Active Engagement	female	15	3.66	0.883	55
			10	3.80	0.977	254
			11	3.91	1.01	405
			12	3.97	0.931	486
			13	3.82	0.975	239
			14	3.72	1.01	248
			15	3.95	1.13	137
		male	16	3.99	1.01	175
			17	3.85	1.00	185
			10	3.46	0.975	240
			11	3.44	0.967	354
			12	3.46	0.982	317
			13	3.41	0.997	154
			14	3.33	1.03	174
			15	3.91	1.04	55
GMS	Emotions	female	10	4.39	0.954	254
			11	4.47	0.954	405
			12	4.63	0.890	486
			13	4.64	0.952	239
			14	4.79	0.995	248
			15	4.89	1.04	137
			16	5.04	0.890	175
		male	17	4.90	0.965	185
			10	4.06	1.04	240
			11	4.07	1.01	354
			12	4.15	1.06	317
			13	4.20	1.12	154
			14	4.33	1.02	174
			15	4.82	1.00	55
GMS	Musical Training	female	10	3.43	1.11	254
			11	3.37	1.09	405
			12	3.46	1.16	486
			13	3.31	1.10	239
			14	3.21	1.25	248
			15	3.23	1.16	137
			16	3.42	1.28	175

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
GMS	Perceptual Abilities	male	17	3.23	1.35	185
			10	3.06	1.15	240
			11	3.00	1.12	354
			12	3.06	1.24	317
			13	3.06	1.17	154
			14	2.98	1.34	174
			15	2.92	1.34	55
		female	10	4.60	0.942	254
			11	4.53	0.969	405
			12	4.61	0.915	486
			13	4.63	0.841	239
			14	4.63	0.906	248
			15	4.60	0.888	137
			16	4.77	0.978	175
			17	4.61	0.941	185
		male	10	4.36	1.00	240
			11	4.39	0.953	354
			12	4.35	1.02	317
			13	4.31	1.04	154
			14	4.50	0.975	174
			15	4.72	0.974	55
GMS	Singing Abilities	female	10	4.50	1.09	254
			11	4.34	1.11	405
			12	4.34	1.09	486
			13	4.24	1.05	239
			14	4.23	1.17	248
			15	4.18	1.02	137
			16	4.31	1.19	175
			17	4.24	1.07	185
		male	10	3.90	1.11	240
			11	3.99	1.13	354
			12	4.01	1.13	317
			13	3.92	1.17	154
			14	3.86	1.16	174
			15	4.36	0.958	55
MHE		female	10	0.788	1.88	270

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
		male	11	0.422	1.91	424
			12	0.357	1.83	487
			13	0.172	1.73	217
			14	-0.257	1.74	196
			15	-0.490	1.53	113
			16	-0.363	1.79	127
			17	-0.689	1.52	119
			10	0.208	1.94	256
			11	0.0315	1.81	366
			12	-0.195	1.81	316
			13	-0.518	1.66	144
			14	-0.690	1.58	120
			15	-0.578	1.66	56
PAC		female	10	3.24	0.818	217
			11	3.28	0.887	341
			12	3.30	0.899	440
			13	3.25	0.881	209
			14	3.31	0.969	222
			15	3.02	1.090	133
			16	2.90	1.020	156
		male	17	3.03	1.120	158
			10	3.32	0.919	221
			11	3.30	0.997	319
			12	3.31	0.985	286
			13	3.47	1.000	138
			14	3.42	0.980	170
SDQ	Conduct Problems	female	10	0.418	0.317	199
			11	0.498	0.335	317
			12	0.473	0.349	428
			13	0.495	0.376	202
			14	0.480	0.379	216
			15	0.534	0.397	133
			16	0.436	0.309	156
		male	17	0.446	0.344	158
			10	0.513	0.37	196
			11	0.569	0.365	301

Scale	Subscale	Gender	Age	M	SD	N
SDQ	Difficulties		12	0.552	0.403	281
			13	0.588	0.362	133
			14	0.544	0.352	169
		female	10	0.583	0.259	199
			11	0.668	0.272	317
			12	0.648	0.295	428
			13	0.668	0.299	202
			14	0.657	0.296	216
			15	0.672	0.353	133
			16	0.563	0.314	156
			17	0.539	0.324	158
		male	10	0.611	0.292	196
			11	0.643	0.292	301
			12	0.629	0.291	281
			13	0.634	0.285	133
			14	0.686	0.306	169
SDQ	Emotional Problems	female	10	0.651	0.447	199
			11	0.775	0.483	317
			12	0.825	0.472	428
			13	0.833	0.459	202
			14	0.902	0.463	216
			15	1.03	0.524	133
			16	0.855	0.423	156
		male	10	0.565	0.460	196
			11	0.601	0.445	301
			12	0.623	0.449	281
			13	0.635	0.465	133
			14	0.712	0.481	169
SDQ	Externalising	female	10	0.608	0.314	199
			11	0.694	0.319	317
			12	0.693	0.346	428
			13	0.742	0.360	202
			14	0.714	0.358	216
			15	0.769	0.373	133
			16	0.696	0.342	156

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
SDQ	Hyperactivity	male	17	0.675	0.347	158
			10	0.678	0.338	196
			11	0.718	0.329	301
			12	0.716	0.366	281
			13	0.764	0.357	133
			14	0.777	0.362	169
		female	10	0.798	0.427	199
			11	0.890	0.429	317
			12	0.916	0.465	428
			13	0.989	0.454	202
			14	0.951	0.487	216
			15	1.03	0.483	133
		male	16	0.972	0.516	156
			17	0.929	0.471	158
			10	0.843	0.427	196
			11	0.868	0.403	301
			12	0.880	0.457	281
			13	0.941	0.485	133
			14	1.01	0.500	169
SDQ	Internalising	female	10	0.563	0.302	199
			11	0.642	0.339	317
			12	0.634	0.346	428
			13	0.628	0.321	202
			14	0.646	0.339	216
			15	0.752	0.346	133
		male	16	0.640	0.312	156
			17	0.637	0.348	158
			10	0.544	0.336	196
			11	0.568	0.350	301
			12	0.563	0.349	281
			13	0.554	0.350	133
			14	0.595	0.373	169
SDQ	Peer Problems	female	10	0.474	0.300	199
			11	0.508	0.351	317
			12	0.441	0.368	428
			13	0.424	0.332	202

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
SDQ	Prosocial	male	14	0.389	0.349	216
			15	0.465	0.343	133
			16	0.422	0.360	156
			17	0.418	0.347	158
			10	0.523	0.351	196
			11	0.534	0.376	301
			12	0.502	0.373	281
			13	0.474	0.402	133
			14	0.477	0.414	169
		female	10	1.64	0.345	199
			11	1.60	0.354	317
			12	1.61	0.337	428
			13	1.54	0.395	202
			14	1.51	0.408	216
			15	1.51	0.342	133
			16	1.48	0.385	156
			17	1.59	0.366	158
		male	10	1.41	0.440	196
			11	1.45	0.414	301
			12	1.46	0.420	281
			13	1.39	0.398	133
			14	1.41	0.495	169
SEM	Attentiveness	female	10	4.13	0.806	160
			11	3.87	0.888	254
			12	3.75	0.918	371
			13	3.53	1.02	176
			14	3.35	0.880	189
			15	3.35	0.924	131
			16	3.35	0.989	151
		male	17	3.36	0.907	157
			10	3.99	0.896	163
			11	3.88	0.901	256
			12	3.72	0.865	246
			13	3.47	0.909	121
			14	3.38	0.925	167
SEM	Behavioural Engagement	female	10	4.51	0.469	160

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
			11	4.32	0.600	254
			12	4.29	0.591	371
			13	4.13	0.682	176
			14	4.04	0.637	189
			15	4.05	0.632	131
			16	4.08	0.657	151
			17	4.12	0.552	157
		male	10	4.28	0.739	163
			11	4.19	0.673	256
			12	4.07	0.715	246
			13	3.88	0.704	121
			14	3.81	0.771	167
SEM	Cognitive Engagement	female	10	3.64	0.78	160
			11	3.60	0.754	254
			12	3.52	0.719	371
			13	3.45	0.710	176
			14	3.39	0.743	189
			15	3.30	0.764	131
			16	3.45	0.730	151
		male	17	3.52	0.616	157
			10	3.67	0.832	163
			11	3.65	0.788	256
			12	3.49	0.897	246
			13	3.38	0.778	121
			14	3.33	0.678	167
SEM	Cognitive Strategy Use	female	10	3.52	0.943	160
			11	3.42	0.907	254
			12	3.39	0.840	371
			13	3.26	0.844	176
			14	3.22	0.891	189
			15	3.11	0.904	131
			16	3.30	0.839	151
		male	17	3.36	0.784	157
			10	3.51	1.01	163
			11	3.55	0.949	256
			12	3.34	1.06	246

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
SEM	emotional engagement		13	3.14	0.924	121
			14	3.11	0.795	167
		female	10	4.05	0.688	160
			11	3.92	0.663	254
			12	3.83	0.675	371
			13	3.65	0.663	176
			14	3.69	0.670	189
			15	3.43	0.669	131
			16	3.66	0.746	151
			17	3.74	0.647	157
		male	10	4.08	0.720	163
			11	3.95	0.700	256
			12	3.83	0.725	246
			13	3.71	0.815	121
			14	3.77	0.747	167
SEM	School Belonging	female	10	4.20	1.04	160
			11	4.02	0.988	254
			12	3.86	1.07	371
			13	3.53	1.12	176
			14	3.45	1.08	189
			15	3.13	1.06	131
			16	3.44	1.07	151
			17	3.58	1.08	157
		male	10	4.11	1.13	163
			11	4.00	1.14	256
			12	3.88	1.18	246
			13	3.66	1.19	121
			14	3.69	1.12	167
SEM	School Compliance	female	10	4.80	0.415	160
			11	4.67	0.598	254
			12	4.70	0.554	371
			13	4.59	0.675	176
			14	4.55	0.669	189
			15	4.57	0.640	131
			16	4.63	0.632	151
			17	4.68	0.492	157



Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>					
		male	10	4.50	0.850	163					
			11	4.43	0.789	256					
			12	4.33	0.815	246					
			13	4.19	0.829	121					
			14	4.14	0.860	167					
		SEM	Self-regulated Learning	female	10	3.76	0.902	160			
					11	3.79	0.837	254			
					12	3.64	0.791	371			
					13	3.64	0.774	176			
					14	3.57	0.816	189			
15	3.48				0.842	131					
16	3.61				0.828	151					
male	17			3.68	0.721	157					
	10			3.82	0.873	163					
	11			3.75	0.870	256					
		female	12	3.64	0.933	246					
			13	3.61	0.832	121					
			14	3.54	0.765	167					
		SEM	Valuing of School Education	female	10	3.97	0.698	160			
					11	3.86	0.716	254			
					12	3.82	0.662	371			
					13	3.73	0.638	176			
					14	3.83	0.697	189			
					15	3.61	0.723	131			
					16	3.79	0.747	151			
male	17			3.84	0.600	157					
	10			4.06	0.693	163					
	11			3.91	0.698	256					
		female	12	3.80	0.720	246					
			13	3.75	0.811	121					
			14	3.82	0.746	167					
		SES	Educational Degree	female	12	5.99	1.06	51			
					14	6.08	1.07	64			
					17	5.58	1.12	71			
				male	14	5.72	1.25	95			
					SOS	Effort	female	14	3.55	0.553	55

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
SOS	Importance	male	14	3.56	0.599	98
		female	14	3.27	0.616	55
		male	14	3.13	0.704	98
TOM	Entity	female	10	2.44	0.702	290
			11	2.43	0.665	437
			12	2.47	0.678	509
			13	2.57	0.698	240
			14	2.62	0.663	251
			15	2.74	0.644	140
			16	2.64	0.724	157
			17	2.67	0.694	158
		male	10	2.56	0.699	264
			11	2.58	0.732	374
			12	2.54	0.731	331
			13	2.55	0.747	157
			14	2.67	0.746	178
			15	2.51	0.660	59
TOM	Gift	female	10	2.34	0.858	290
			11	2.37	0.797	437
			12	2.52	0.854	509
			13	2.67	0.853	240
			14	2.82	0.820	251
			15	2.91	0.787	140
			16	2.89	0.928	157
			17	2.86	0.795	158
		male	10	2.59	0.872	264
			11	2.55	0.875	374
			12	2.53	0.887	331
			13	2.56	0.924	157
			14	2.81	0.938	178
			15	2.64	0.801	59
TOM	Improvement	female	10	4.08	0.669	290
			11	4.13	0.663	437
			12	4.16	0.638	509
			13	4.15	0.670	240
			14	4.13	0.667	251

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
TOM	Incremental	male	15	4.04	0.623	140
			16	4.25	0.646	157
			17	4.21	0.643	158
			10	4.16	0.735	264
			11	4.12	0.740	374
			12	4.06	0.824	331
			13	4.08	0.818	157
			14	4.11	0.746	178
			15	4.32	0.519	59
		female	10	3.97	0.592	290
			11	4.00	0.572	437
			12	4.05	0.544	509
			13	4.08	0.545	240
			14	4.07	0.596	251
			15	4.01	0.541	140
			16	4.17	0.568	157
			17	4.20	0.562	158
		male	10	4.03	0.651	264
			11	4.01	0.652	374
			12	4.01	0.720	331
			13	3.99	0.742	157
			14	4.05	0.604	178
			15	4.16	0.451	59
TOM	Learning	female	10	3.85	0.698	290
			11	3.87	0.665	437
			12	3.95	0.618	509
			13	4.01	0.622	240
			14	4.00	0.676	251
			15	3.98	0.622	140
			16	4.10	0.668	157
		male	17	4.19	0.653	158
			10	3.90	0.693	264
			11	3.89	0.711	374
			12	3.96	0.785	331
			13	3.90	0.851	157
			14	3.99	0.664	178

Scale	Subscale	Gender	Age	M	SD	N
TOM	Stable	female	15	4.00	0.594	59
			10	2.53	0.805	290
			11	2.48	0.817	437
			12	2.43	0.755	509
			13	2.46	0.819	240
			14	2.41	0.749	251
			15	2.57	0.709	140
		male	16	2.39	0.762	157
			17	2.48	0.772	158
			10	2.54	0.858	264
			11	2.61	0.89	374
			12	2.54	0.869	331
			13	2.54	0.911	157
			14	2.52	0.854	178
			15	2.39	0.800	59
TOI	Growth Goal	female	10	3.72	0.712	295
			11	3.77	0.710	443
			12	3.75	0.661	519
			13	3.56	0.695	250
			14	3.52	0.629	262
			15	3.41	0.615	141
			16	3.53	0.659	179
		male	17	3.50	0.648	184
			10	3.66	0.653	264
			11	3.59	0.760	375
			12	3.71	0.729	334
			13	3.52	0.730	157
			14	3.68	0.673	183
			15	3.53	0.780	59
TOI	Incremental Theory	female	10	3.48	1.100	295
			11	3.80	1.150	443
			12	4.11	1.040	519
			13	4.11	1.100	250
			14	4.01	0.971	262
			15	3.96	0.978	141
			16	3.87	1.080	179

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
TPI	Agreeableness	male	17	4.01	1.070	184
			10	3.67	1.140	264
			11	3.82	1.060	375
			12	4.01	1.150	334
			13	4.00	1.130	157
			14	4.01	1.180	183
			15	4.48	1.050	59
		female	10	5.37	1.09	144
			11	5.35	1.13	234
			12	5.30	1.16	363
			13	5.18	1.14	178
			14	5.13	1.09	195
			15	5.00	1.15	131
			16	5.14	1.13	163
			17	5.45	1.16	182
		male	10	4.96	1.22	148
			11	4.93	1.15	243
			12	4.94	1.16	240
			13	4.79	0.964	115
			14	4.72	1.13	167
TPI	Conscientiousness	female	10	5.14	1.17	144
			11	5.14	1.15	234
			12	5.01	1.17	363
			13	4.88	1.30	178
			14	4.79	1.26	195
			15	4.70	1.22	131
			16	4.84	1.21	163
			17	5.18	1.31	182
		male	10	4.87	1.16	148
			11	4.82	1.16	243
			12	4.66	1.17	240
			13	4.64	1.17	115
			14	4.79	1.18	167
		female	10	4.77	1.15	144
			11	4.67	1.17	234
			12	4.75	1.12	363

Scale	Subscale	Gender	Age	<i>M</i>	<i>SD</i>	<i>N</i>
		male	13	4.59	1.20	178
			14	4.51	1.29	195
			15	4.36	1.39	131
			16	4.61	1.26	163
			17	4.79	1.32	182
			10	4.72	1.19	148
			11	4.85	1.14	243
			12	4.86	1.10	240
			13	4.60	1.07	115
			14	4.79	1.32	167
		female	10	4.77	1.29	144
			11	4.70	1.32	234
			12	4.73	1.35	363
			13	4.80	1.43	178
			14	4.89	1.40	195
			15	4.66	1.38	131
			16	4.63	1.47	163
			17	4.66	1.58	182
			10	4.61	1.30	148
			11	4.81	1.20	243
			12	4.60	1.25	240
			13	4.89	1.20	115
			14	4.74	1.34	167
TPI	Extraversion	female	10	5.33	1.15	144
			11	5.21	1.13	234
			12	5.26	1.12	363
			13	4.96	1.12	178
			14	5.13	1.10	195
			15	5.02	1.09	131
			16	5.33	1.06	163
			17	5.51	1.10	182
			10	4.98	1.14	148
			11	4.76	1.27	243
			12	4.82	1.02	240
			13	4.89	1.02	115
			14	5.04	1.18	167
		male	10	4.98	1.14	148
			11	4.76	1.27	243
			12	4.82	1.02	240
			13	4.89	1.02	115
			14	5.04	1.18	167
			10	5.33	1.15	144
			11	5.21	1.13	234
			12	5.26	1.12	363
			13	4.96	1.12	178
			14	5.13	1.10	195
			15	5.02	1.09	131
			16	5.33	1.06	163
			17	5.51	1.10	182
			10	4.98	1.14	148
			11	4.76	1.27	243
			12	4.82	1.02	240
			13	4.89	1.02	115
			14	5.04	1.18	167

