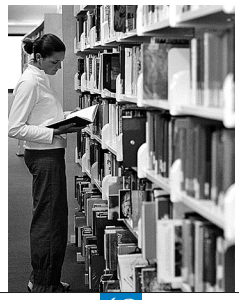

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International Database

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FILES IN THE DATABASE

The PISA international database consists of six data files[1]: four with student responses, one with school responses and one with parent responses. All are provided in text (or ASCII format) with the corresponding SAS® and SPSS® control files.

Student files

Student performance and questionnaire data file (this file can be found on the PISA website *www.pisa.oecd.org*).

For each student who participated in the assessment, the following information is available:

- Identification variables for the country, school and student;
- The student responses to the two questionnaires, *i.e.*, the student questionnaire and the international option information communication technology *(ICT)* questionnaire;
- The indices derived from each student's responses to the original questions in the questionnaires;
- The students' performance scores in mathematics, reading, science, the three scales of science and embedded attitude scores in interest and support (five plausible values for each domain);
- The student weight variable and 80 Fay's replicates for the computation of the sampling variance estimates;
- Two weight factors to compute normalised (replicate) weights for multi-level analysis, one for countries and one for subnational entities;
- Three sampling related variables: the randomised final variance stratum, the final variance unit and the original explicit strata, mostly labeled by country;
- Some variables that come from the cognitive test: test language, effort variables and three science items that were internationally deleted because of students' misconceptions;
- Database version with the date of the release.

Two types of indices are provided in the student questionnaire files. The first set is based on a transformation of one variable or on a combination of the information included in two or more variables. Twenty-five indices are included in the database from this first type. The second set is the result of a Rasch scaling and consists of weighted likelihood estimate indices. Twenty-three indices from the student questionnaire and 4 indices from the international option on information communication technology questionnaire are included in the database from this second type. The index for socio-economic status (ESCS) is derived as factor scores from a Principal Component Analysis and is also included in the database. For a full description of the indices and how to interpret them see Chapter 16.

For each domain, *i.e.* mathematics, reading and science, and for each scale in science, *i.e. identifying scientific issues, explaining phenomena scientifically* and *using scientific evidence,* a set of five plausible values (transformed to the PISA scale) are provided.

The metrics of the various scales are established so that in the year that the scale is first established the OECD student mean score is 500 and the pooled OECD standard deviation is 100. The reading scale was established in 2000, the mathematics scale in 2003 and the science scale in 2006. When establishing the scale the data is weighted to ensure that each OECD country is given equal weight.

In the case of science, the scale that was established in 2006, the average of the five plausible values means for the 30 equally weighted participating OECD countries has been set at 500 and the average of the five plausible values standard deviations has been set at 100. Note that it follows that the means and

variances of each of the five plausible values are not exactly 500 and 100. The same transformation was applied to the three science sub-scales.

Reading plausible values were mapped to the PISA 2000 scale and mathematics plausible values were mapped to the PISA 2003 scale. See chapter 12 for details of these mappings.

The variable *W_FSTUWT* is the final student weight. The sum of the weights constitutes an estimate of the size of the target population, *i.e.* the number of 15-year-old students in grade 7 or above in that country attending school. When analysing weighted data at the international level, large countries have a greater contribution to the results than small countries. This weighting is used for the OECD total in the tables of the international report for the first results from PISA 2006 (OECD, 2007). To weight all countries equally for a summary statistic, the OECD average is computed and reported. The OECD average is computed as follows. First, the statistic of interest is computed for each OECD country using the final student weights. Second, the mean of the country statistics is computed and reported as the OECD average.[2]

For a full description of the weighting methodology and the calculation of the weights, see Chapter 8). How to use weights in analysis of the database is described in detail in the PISA 2003 Data Analysis Manual for SPSS® or SAS® users (OECD, 2005), which is available through *www.pisa.oecd.org*. The data analysis manual also explains the theory behind sampling, plausible values and replication methodology and how to compute standard errors in case of two-stage, stratified sampling designs.

All student cognitive files can be found on the PISA website: *www.pisa.oecd.org*.

For each student who participated in the assessment, the following information is available:

- Identification variables for the country, school and student;
- Test booklet identification;
- The student responses to the cognitive and attitude items. When original reponses consist of multiple digits (complex multiple choice or open ended items), the multiple digits were recoded into single digit variables for use in scaling software). A "T" was added to the end of the recoded single digit variable names. The original response variables have been added at the end of the single digit, unscored file (without a T at the end of the variable name and the Q replaced by an R, see further below). The scored data file only has one single digit variable per item with scores instead of response categories.
- Test language;
- Effort self report;
- Database version with the date of the release.

The PISA items are organised into units. Each unit consists of a stimulus (consisting of a piece of text or related texts, pictures or graphs) followed by one or more questions. A unit is identified by a short label and by a long label. The units' short labels consist of four characters and form the first part of the variable names in the data files. The first character is R, M or S for reading, mathematics or science, respectively. The next three characters indicate the unit within the domain. For example, M155 is a mathematics unit. The item names (usually seven- or eight-digits) represent questions within a unit and are used as variable names (in the current example the item names within the unit are M155Q01, M155Q02T, M155Q03T and M155Q04T). Thus items within a unit have the same initial four characters plus a question number. Responses that needed to be recoded into single digit variables have a "T" at the end of the variable name. The original multiple digit responses have been added to the end of the unscored, single digit file without a "T" in the name and with the "Q" replaced by a "R" (for example, the variable M155Q02T is a recoded item with the corresponding original responses in M155R02 at the end of the file). The full variable label

indicates the domain the unit belongs to, the PISA cycle in which the item was first used, the full name of the unit and the question number. For example, the variable label for M155Q01 is "MATH - P2000 POPULATION PYRAMIDS (Q01)".

In all both files, the cognitive items are sorted by domain and alphabetically by item name within domain. This means that the mathematics items appear at the beginning of the file, followed by the reading items and then the science items. The embedded attitude items have been placed after the cognitive items, first the embedded interest items followed by the embedded support items. Within domains, units with smaller numeric identification appear before those with larger identification, and within each unit, the first question will precede the second, and so on.

School file

The school questionnaire data file (this file can be found on the PISA website *www.pisa.oecd.org*).

For each school that participated in the assessment, the following information is available:

- The identification variables for the country and school;
- The school responses on the school questionnaire;
- The school indices derived from the original questions in the school questionnaire;
- The school weight;
- Explicit strata with national labels; and
- Database version with the date of the release.

The school file contains the original variables collected through the school context questionnaire. In addition, two types of indices are provided in the school questionnaire files. The first set is based on a transformation of one variable or on a combination of two or more variables. The database includes 14 indices from this first type. The second set is the result of a Rasch scaling and consists of weighted likelihood estimate indices. Four indices are included in the database from this second type. For a full description of the indices and how to interpret them see Chapter 16. The school weight (*W_FSCHWT*) is the trimmed school-base weight adjusted for non-response (see also Chapter 8).

Although the student samples were drawn from within a sample of schools, the school sample was designed to optimise the resulting sample of students, rather than to give an optimal sample of schools. For this reason, it is always preferable to analyse the school-level variables as attributes of students, rather than as elements in their own right (Gonzalez and Kennedy, 2003). Following this recommendation one would not estimate the percentages of private schools versus public schools, for example, but rather the percentages of students attending a private school or public schools. From a practical point of view, this means that the school data should be merged with the student data file prior to analysis.

For general information about analysis of school data see the PISA 2003 Data Analysis Manual for SPSS® or SAS® users (OECD, 2005), also available through *www.pisa.oecd.org*.

Parent file

The parent questionnaire file (this file can be found on the PISA website: *wwwpisa.oecd.org*). The following information is available:

- The identification variables for the country, school and student;
- The parents' responses on the parent questionnaire;

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- The parent indices derived from the original questions in the parent questionnaire; and
- Database version with the date of the release.

The parent file contains the original variables collected through the parent context questionnaire as a national option instrument. In addition, two types of indices are provided in the parent questionnaire file. The first set is based on a transformation of one variable or on a combination of two or more variables. The database includes six indices from this first type. The second set is the result of a Rasch scaling and consists of weighted likelihood estimate indices. Eleven indices are included in the database from this second type. For a detailed description of the indices and how to interpret them see Chapter 9.

Due to the high parent non-response in most countries, caution is needed when analysing this data. Non-response is not random. When using the final student weights from the student file, the weights of valid students in the analysis do not sum up to the population size of parents of PISA eligible students. A weight adjustment is not provided in the database.

RECORDS IN THE DATABASE

Records included in the database

Student and parent files

- All PISA students who attended test (assessment) sessions.
- PISA students who only attended the questionnaire session are included if they provided at least one response to the student questionnaire and the father's or the mother's occupation is known from the student or the parent questionnaire.

School file

- All participating schools – that is, any school where at least 25% of the sampled eligible, non-excluded students were assessed – have a record in the school-level international database, regardless of whether the school returned the school questionnaire.

Records excluded from the database

Student and parent file

- Additional data collected by countries as part of national or international options.
- Sampled students who were reported as not eligible, students who were no longer at school, students who were excluded for physical, mental or linguistic reasons, and students who were absent on the testing day.
- Students who refused to participate in the assessment sessions.
- Students from schools where less than 25% of the sampled and eligible, non-excluded students participated.

School file

- Additional data collected by countries as part of national or international options.
- Schools where fewer than 25% of the sampled eligible, non-excluded students participated in the testing sessions.

REPRESENTING MISSING DATA

The coding of the data distinguishes between four different types of missing data:

- Item level non-response: 9 for a one-digit variable, 99 for a two-digit variable, 999 for a three-digit variable, and so on. Missing codes are shown in the codebooks. This missing code is used if the student or school principal was expected to answer a question, but no response was actually provided.

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- Multiple or invalid responses: 8 for a one-digit variable, 98 for a two-digit variable, 998 for a three-digit variable, and so on. For the multiple-choice items code 8 is used when the student selected more than one alternative answer.
- Not-administered: 7 for a one-digit variable, 97 for a two-digit variables, 997 for a three-digit variable, and so on. Generally this code is used for cognitive and questionnaire items that were not administered to the students and for items that were deleted after assessment because of misprints or translation errors.
- Not reached items: all consecutive missing values clustered at the end of test session were replaced by the non-reached code, "r", except for the first value of the missing series, which is coded as item level non-response.

HOW ARE STUDENTS AND SCHOOLS IDENTIFIED?

The student identification from the student and parent files consists of three variables, which together form a unique identifier for each student:

- A country identification variable labelled *COUNTRY*. The country codes used in PISA are the ISO numerical three-digit country codes.
- A school identification variable labelled *SCHOOLID*.
- A student identification variable labelled *STIDSTD*.

A fourth variable has been included to differentiate adjudicated sub-national entities within countries. This variable (*SUBNATIO*) is used for four countries as follows:

- *Belgium*. The value "05601" is assigned to the Flemish region, "05602" to the French region and "05603" to the German region of Belgium
- *Italy*. The value "38001" is assigned to Provincia Autonoma of Bolzano, "38002" to Provincia Basilicata, "38003" to Provincia Campania, "38004" to Provincia Emilia Romagna, "38005" to Provincia Friuli Venezia Giulia, "38006" to Provincia Liguria, "38007" to Provincia Lombardia, "38008" to Provincia Piemonte, "38009" to Provincia Puglia, "38010" to Provincia Sardegna, "38011" to Provincia Sicilia, "38012" to Provincia Trento, "38013" to Provincia Veneto, "38014" to the rest of Italy.
- *Spain*. The value "72401" is assigned to Andalusia, "72402" to Aragon, "72403" to Asturias, "72406" to Cantabria, "72407" to Castile and Leon, "72409" to Catalonia, "72411" to Galicia, "72412" to La Rioja, "72415" to Navarre, "72416" to Basque Country, and
- *United Kingdom*. The value "82610" is assigned to England, Northern Ireland and Wales and the value "82620" is assigned to Scotland.

A fifth variable is added to make the identification of countries more convenient. The variable *CNT* uses the ISO 3166-1 ALPHA-3 classification, which is based on alphabetical characters rather than numeric characters (for example, for Sweden has COUNTRY=752 and CNT=SWE).

A sixth variable (*STRATUM*) is also included to differentiate sampling strata. Value labels are provided in the control files to indicate the population defined by each stratum.[3]

The school identification consists of two variables, which together form a unique identifier for each school:

- The country identification variable labelled *COUNTRY*. The country codes used in PISA are the ISO numerical three-digit country codes.
- The school identification variable labelled *SCHOOLID*.

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FURTHER INFORMATION

A full description of the PISA 2006 database and guidelines on how to analyse it in accordance with the complex methodologies used to collect and process the data is provided in the *PISA 2006 Data Analysis Manual* (OECD, forthcoming) available through *www.pisa.oecd.org*.

Notes

1. Two additional data files were created and sent to countries on request. One file contains the student abilities in WLEs on the 5 domains. The other file contains plausible values for students abilities on an alternative set of science scales, the content subscales.

2. The definition of the OECD average has changed between PISA 2003 and PISA 2006. In previous cycles, the OECD average was based on a pooled, equally weighted database. To compute the OECD average the data was weighted by an adjusted student weight variable that made the sum of the weights equal in all countries.

3. Note that not all participants permit the identification of all sampling strata in the database.

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Reader's Guide

Country codes – the following country codes are used in this report:

OECD countries

AUS	Australia
AUT	Austria
BEL	Belgium
BEF	Belgium (French Community)
BEN	Belgium (Flemish Community)
CAN	Canada
CAE	Canada (English Community)
CAF	Canada (French Community)
CZE	Czech Republic
DNK	Denmark
FIN	Finland
FRA	France
DEU	Germany
GRC	Greece
HUN	Hungary
ISL	Iceland
IRL	Ireland
ITA	Italy
JPN	Japan
KOR	Korea
LUX	Luxembourg
LXF	Luxembourg (French Community)
LXG	Luxembourg (German Community)
MEX	Mexico
NLD	Netherlands
NZL	New Zealand
NOR	Norway
POL	Poland
PRT	Portugal
SVK	Slovak Republic
ESP	Spain
ESB	Spain (Basque Community)
ESC	Spain (Catalonian Community)
ESS	Spain (Castillian Community)
SWE	Sweden
CHE	Switzerland
CHF	Switzerland (French Community)
CHG	Switzerland (German Community)
CHI	Switzerland (Italian Community)
TUR	Turkey
GBR	United Kingdom
IRL	Ireland
SCO	Scotland
USA	United States

Partner countries and economies

ARG	Argentina
AZE	Azerbaijan
BGR	Bulgaria
BRA	Brazil
CHL	Chile
COL	Colombia
EST	Estonia
HKG	Hong Kong-China
HRV	Croatia
IDN	Indonesia
JOR	Jordan
KGZ	Kyrgyztan
LIE	Liechtenstein
LTU	Lithuania
LVA	Latvia
LVL	Latvia (Latvian Community)
LVR	Latvia (Russian Community)
MAC	Macao-China
MNE	Montenegro
QAT	Qatar
ROU	Romania
RUS	Russian Federation
SRB	Serbia
SVN	Slovenia
TAP	Chinese Taipei
THA	Thailand
TUN	Tunisia
URY	Uruguay

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List of abbreviations – the following abbreviations are used in this report:

ACER	Australian Council for Educational Research
AGFI	Adjusted Goodness-of-Fit Index
BRR	Balanced Repeated Replication
CBAS	Computer Based Assessment of Science
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CITO	National Institute for Educational Measurement, The Netherlands
CIVED	Civic Education Study
DIF	Differential Item Functioning
ENR	Enrolment of 15-year-olds
ESCS	PISA Index of Economic, Social and Cultural Status
ETS	Educational Testing Service
IAEP	International Assessment of Educational Progress
I	Sampling Interval
ICR	Inter-Country Coder Reliability Study
ICT	Information Communication Technology
IEA	International Association for the Evaluation of Educational Achievement
INES	OECD Indicators of Education Systems
IRT	Item Response Theory
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISEI	International Socio-Economic Index
MENR	Enrolment for moderately small school
MOS	Measure of size
NCQM	National Centre Quality Monitor
NDP	National Desired Population
NEP	National Enrolled Population
NFI	Normed Fit Index
NIER	National Institute for Educational Research, Japan
NNFI	Non-Normed Fit Index
NPM	National Project Manager
OECD	Organisation for Economic Cooperation and Development
PISA	Programme for International Student Assessment
PPS	Probability Proportional to Size
PGB	PISA Governing Board
PQM	PISA Quality Monitor
PSU	Primary Sampling Units
QAS	Questionnaire Adaptations Spreadsheet
RMSEA	Root Mean Square Error of Approximation
RN	Random Number
SC	School Co-ordinator
SE	Standard Error
SD	Standard Deviation
SEM	Structural Equation Modelling
SMEG	Subject Matter Expert Group
SPT	Study Programme Table
TA	Test Administrator
TAG	Technical Advisory Group
TCS	Target Cluster Size
TIMSS	Third International Mathematics and Science Study
TIMSS-R	Third International Mathematics and Science Study – Repeat
VENR	Enrolment for very small schools
WLE	Weighted Likelihood Estimates

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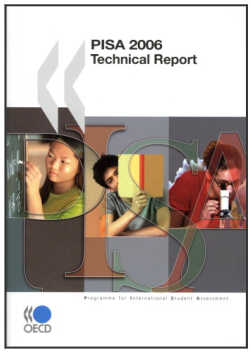

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