



GRE[®]

Listening. Learning. Leading.[®]

**A Comprehensive Review
of Published GRE[®]
Validity Data**

ASSESS ABILITY. PREDICT PERFORMANCE.

A Summary from ETS

A Comprehensive Review of Published GRE® Validity Data

The *Graduate Record Examinations*® (GRE®) *General Test* measures skills that faculty and graduate deans have consistently said are essential to graduate school success. These skills of verbal reasoning, quantitative reasoning, and critical thinking and analytical writing are foundational skills for applicants to a U.S. graduate program, regardless of educational or linguistic background or country of origin.

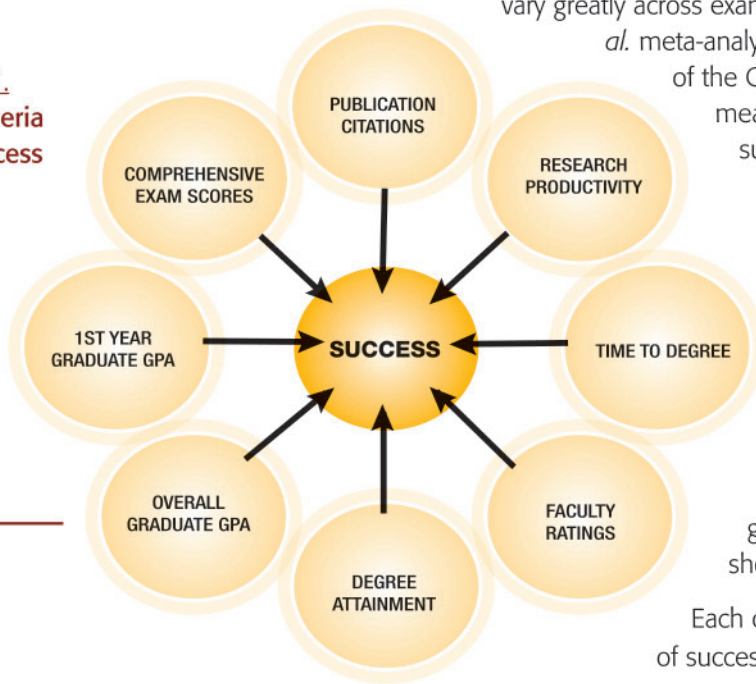
Although the GRE Program has many studies of the predictive validity of the GRE *General Test* (which are available on the GRE website: www.ets.org/gre), a recent meta-analysis by non-ETS researchers Nathan Kuncel, Sarah Hezlett and Deniz Ones provides additional positive evidence of the relationship of the GRE *General Test* to various criteria of graduate school success.¹ This meta-analysis is important because predictive validity studies are often difficult to conduct for a variety of reasons (e.g., insufficient data, test scores or predictors of success that do not vary greatly across examinees). Compared with earlier research, the Kuncel *et al.* meta-analysis improved on these studies by examining the validity

of the GRE *General Test* for multiple disciplines using multiple measures of success, and by addressing statistical artifacts such as range restriction.

One strength of the Kuncel *et al.* research is that the meta-analysis analyzed data from a very large data set involving more than 1,753 independent samples based on a pool of more than 80,000 students. In addition, the study looked at five predictors of success and eight criteria for success. The predictors included the three measures of the GRE *General Test* (verbal reasoning, quantitative reasoning and analytical reasoning), GRE *Subject Test* scores and undergraduate grade point average (UGPA). The criteria for success are shown in the figure to the left.

Each of these criteria can be considered a different dimension of successful performance in graduate school.

Figure 1.
The criteria
for success



Results of the Kuncel *et al.* study

Results from this study show that:

1. The GRE *General Test* is a “generalizably valid predictor of first-year graduate GPA, overall graduate GPA, comprehensive exam scores, publication citation counts and faculty ratings.”
2. The GRE *General Test* also correlates positively with degree attainment and research productivity.
3. The GRE *General Test* has better predictive validity than undergraduate grades or letters of recommendation.
4. The GRE *Subject Tests* are better predictors of success than either the GRE *General Test* or undergraduate GPA.

This meta-analysis study is important because these results apply across a range of intended academic majors, across native speakers of English and nonnative speakers of English, across traditional and nontraditional students and across master’s and doctoral programs.²

1 Kuncel, N. R., Hezlett, S. A. and Ones, D. S. (2001). A comprehensive meta-analysis of the predictive validity of the *Graduate Record Examinations*: Implications for graduate student selection and performance. *Psychological Bulletin*, 127 (1), 162-181.

2 The master’s analyses can be found in “The Validity of the *Graduate Record Examination* for Master’s and Doctoral Programs: A Meta-Analytic Investigation” by Kuncel, N.R., Wee, S., Serafin, S. and Hezlett, S.A. (In press) GRE Research Report. Princeton, NJ: ETS.

Validity of the Analytical Writing Measure

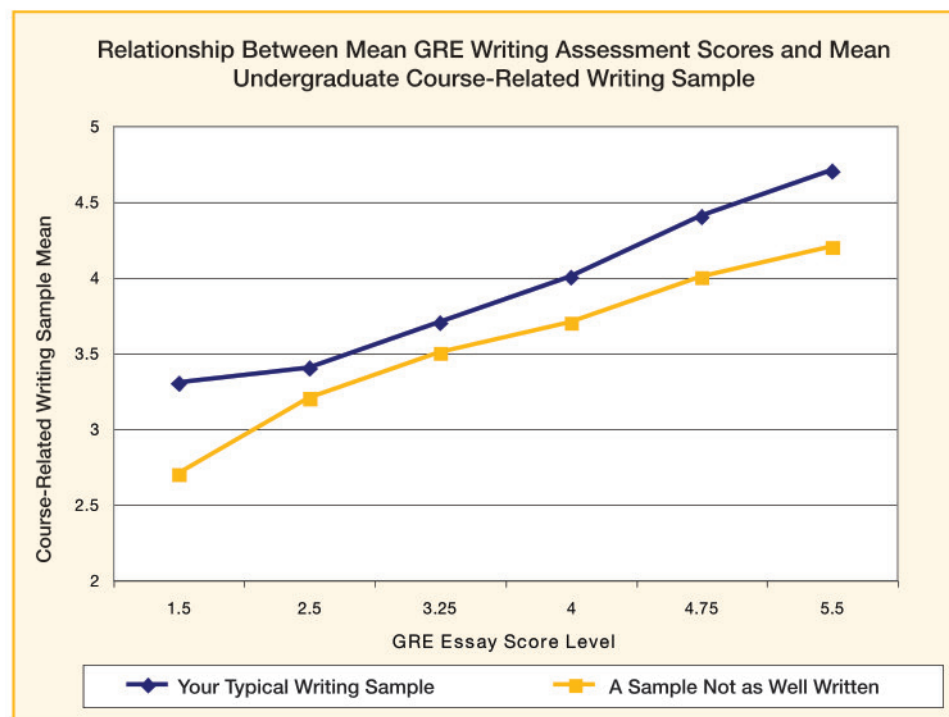
Because the Kuncel *et al.* meta-analysis was conducted before the Analytical Writing (AW) measure was introduced into the GRE *General Test*, it may be useful to include validity information for this measure. The two tasks that comprise the AW are both considered essential in many fields of graduate study. These two tasks are complementary in that the first requires the writer to construct his/her own argument about an issue, and the second requires a critique of someone else's argument by assessing its claims. For virtually all disciplines, AW adds value to the GRE *General Test* because it provides unique information about test-taker abilities over and above skills measured in the Verbal and Quantitative measures.

Demonstrating the construct validity of the writing measure can be done by showing how AW correlates with other measures it is intended to resemble. As an illustration, AW correlates positively with other samples of academic writing produced by examinees³ as shown in the figure below. Examinees in this study were asked to provide two writing samples: one representing their typical written work and one not quite as well written.

This graph shows that there is a strong positive relationship between the GRE essay scores and both of the writing samples from examinees. It should be noted that the AW correlates with these other indicators of writing skill more closely than does the personal statement that many students submit with their applications.⁴

Furthermore, data indicate that AW has a low correlation (.21) with the quantitative measure and a moderate correlation (.60) with the verbal measure — a finding that is consistent with the structure and intent of those measures.⁵ Thus, AW is providing unique and valuable information beyond the multiple-choice GRE *General Test* measures.

Figure 2.



Summary

Because faculty want to make the best possible admissions decisions about graduate school applicants, it is important to look objectively at the predictive value of the GRE *General Test*. The Kuncel *et al.* study used all existing data to arrive at the study's conclusions that the GRE *General Test* is a valid predictor of many criteria of graduate school success. In addition, other research has demonstrated that the Analytical Writing section of the GRE *General Test* can provide valuable information about applicants' abilities to produce analytical essays. For these reasons, the GRE *General Test* is a valuable asset in the graduate admissions process.

3 Powers, D.E., Fowles, M.E. and Welsh, C.K. (1999) Further validation of a writing assessment for graduate admissions. GRE Research Report 96-13. Princeton, NJ: ETS.

4 Powers, D.E., and Fowles, M.E. (1997) The personal statement as an indicator of writing skill: A cautionary note. *Educational Assessment*, 4 (1), 75-87.

5 The correlation between the Verbal and Quantitative measures is .36.

For More Information

To get the most up-to-date information about the GRE *General Test*, please visit **www.ets.org/gre** or contact an ETS representative at **(609) 683-2002**.



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www.ets.org



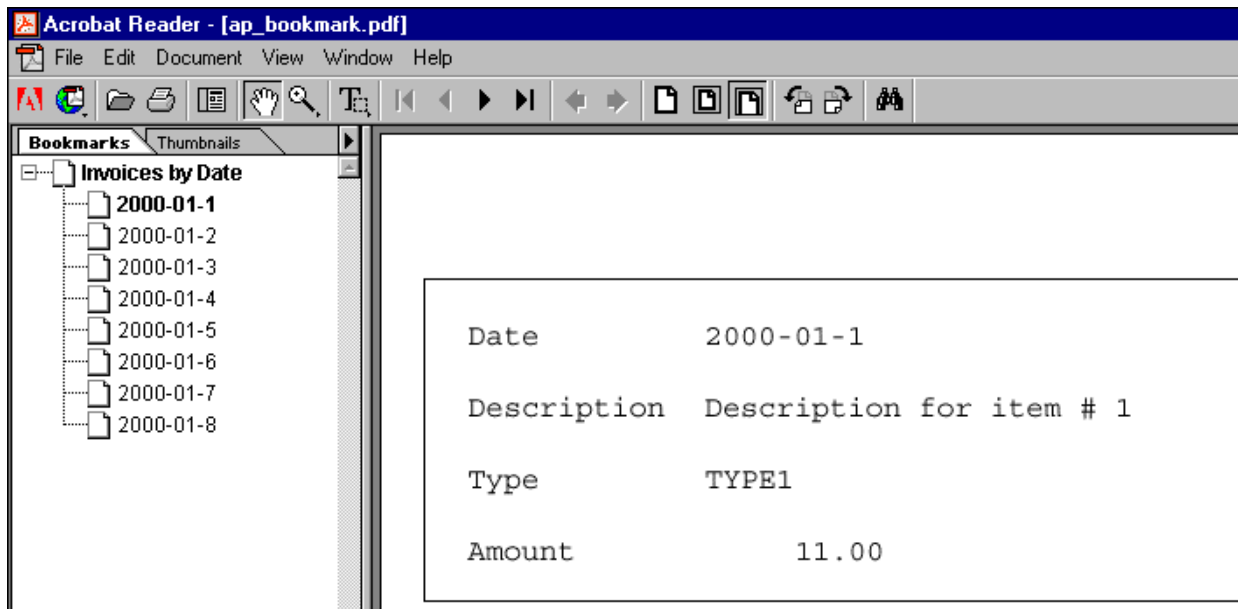
PDF BOOKMARK SAMPLE

Sample Date:	May 2001
Prepared by:	Accelio Present Applied Technology
Created and Tested Using:	<ul style="list-style-type: none">• Accelio Present Central 5.4• Accelio Present Output Designer 5.4
Features Demonstrated:	<ul style="list-style-type: none">• Primary bookmarks in a PDF file.• Secondary bookmarks in a PDF file.

Overview

This sample consists of a simple form containing four distinct fields. The data file contains eight separate records.

By default, the data file will produce a PDF file containing eight separate pages. The selective use of the bookmark file will produce the same PDF with a separate pane containing bookmarks. This screenshot of the sample output shows a PDF file with bookmarks.



The left pane displays the available bookmarks for this PDF. You may need to enable the display of bookmarks in Adobe® Acrobat® Reader by clicking **Window > Show Bookmarks**. Selecting a date from the left pane displays the corresponding page within the document.

Note that the index has been sorted according to the specification in the bookmark file, and that pages within the file are created according to the original order in the data file.



ACCELIO™

Sample Data File

```
^reformat trunc
^symbolset WINLATIN1
^field trans_date
2000-01-1
^field description
Description for item #1
^field trans_type
TYPE1
^field trans_amount
11.00
^page 1
^field trans_date
2000-01-2
^field description
Description for item #2
^field trans_type
TYPE2
^field trans_amount
11.00
^page 1
^field trans_date
2000-01-3
^field description
Description for item #3
^field trans_type
TYPE3
```

Sample Bookmark File

```
[invoices]
Invoices by Date=0
trans_date=1,A
[type]
Invoices by Item Type=0
trans_type=1,A
[amount]
Invoices by Transaction Amount=0
trans_amount=1,D
```

The example bookmark file includes three distinct sections:

- Invoices sorted, ascending, by date.
- Invoices sorted, ascending, by item type.
- Invoices sorted, descending, by transaction amount.



Sample Files

This sample package contains:

Filename	Description
ap_bookmark.IFD	The template design.
ap_bookmark.mdf	The template targeted for PDF output.
ap_bookmark.dat	A sample data file in DAT format.
ap_bookmark.bmk	A sample bookmark file.
ap_bookmark.pdf	Sample PDF output.
ap_bookmark_doc.pdf	A document describing the sample.

Deploying the Sample

To deploy this sample in your environment:

1. Open the template design **ap_bookmark.IFD** in Output Designer and recompile the template for the appropriate presentment target.
2. Modify the **-z** option in the **^job** command in the data file **ap_bookmark.dat** to:
 - Identify the target output device.
 - Identify the bookmark file using the **-abmk** command.
 - Identify the section for which to generate bookmarks, if desired, using the **-abms** command.

For example,

To bookmark by ...	Use the command line parameter ...
Invoices	-abmk ap_bookmark.bmk -abms invoices
Type	-abmk ap_bookmark.bmk -abms type
Amount	-abmk ap_bookmark.bmk -abms amount



ACCELIO™

3. Place the accompanying files in directories consistent with your implementation:
 - Place **ap_bookmark.IFD** in the **Designs** subdirectory for Output Designer.
 - Place **ap_bookmark.mdf** in the forms subdirectory accessible to Central.
 - Place **ap_bookmark.bmk** in an addressable directory.

Running the Sample

- To run this sample, place **ap_bookmark.dat** in the collector directory scanned by Central.

Sample PDF Document

Robert Maron
Grzegorz Grudziński

February 20, 1999

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Chapter 1

Template

1.1 How to compile a `.tex` file to a `.pdf` file

1.1.1 Tools

To process the files you (may) need:

- `pdflatex` (for example from `tetex` package $\geq 0.9-6$, which you can get from [Red Hat 5.2](#));
- `acroread` (a PDF viewer, available from <http://www.adobe.com/>);
- `ghostscript` ≥ 5.10 (for example from [Red Hat Contrib](#)) and `ghostview` or `gv` (from RedHat Linux);
- `efax` package could be useful, if you plan to fax documents.

1.1.2 How to use the tools

Follow these steps:

1. put all source `.tex` files in one directory, then `chdir` to the directory (or put some of them in the `LTEXsearch` path — if you know how to do this);
2. run “`pdflatex file.tex`” on the main file of the document three times (three — to prepare valid table of contents);
3. to see or print the result use `acroread` (unfortunately some versions of `acroread` may produce PostScript which is too complex), or

4. run `ghostscript`: “`gv file.pdf`” to display or:
“`gs -dNOPAUSE -sDEVICE=pswrite -q -dBATCH -sOutputFile=file.ps file.pdf`”
to produce a PostScript file;
5. run “`fax send phone-number file.ps`” as root to send a fax, or — if you know how to do this — modify the fax script to be able to fax `.pdf` files directly (you have to insert “`%PDF*`” somewhere...).

1.2 How to write a document

1.2.1 The main document

Choose the name of the document, say `document`. Copy `template.tex` to `document.tex`, then edit it, change the title, the authors and set proper `include(s)` for all the chapters.

1.2.2 Chapters

Each chapter should be included in the main document as a separate file. You can choose any name for the file, but we suggest adding a suffix to the name of the main file. For our example we use the file name `document_chapter1.tex`.

First, copy `template_chapter.tex` to `document_chapter1.tex` and add the line

```
\include{document_chapter1}
```

in the `document.tex`, then edit `document_chapter1.tex`, change the chapter title and edit the body of the chapter appropriately.

1.2.3 Spell-checking

Do use a spell-checker, please!

You may also want to check grammar, style and so on. Actually you should do it (if you have enough spare time). But you *must* check spelling!

You can use the `ispell` package for this, from within `emacs`, or from the command line:

```
ispell -t document_chapter1.tex
```


1.3 \LaTeX and $\text{pdf}\text{\LaTeX}$ capabilities

1.3.1 Overview

First you edit your source `.tex` file. In \LaTeX you compile it using the `latex` command to a `.dvi` file (which stands for device-independent). The `.dvi` file can be converted to any device-dependent format you like using an appropriate driver, for example `dvips`.

When producing `.pdf` files you should use `pdflatex`, which produces directly `.pdf` files out of `.tex` sources. Note that in the `.tex` file you may need to use some PDF specific packages.

For viewing `.tex` files use your favourite text editor, for viewing `.dvi` files under X Window System use `xdvi` command, `.ps` files can be viewed with `gv` (or `ghostview`) and `.pdf` files with `acroread`, `gv` or `xpdf`.

1.3.2 \LaTeX

A lot of examples can be found in this document.

You should also print

- `doc/latex/general/latex2e.dvi` and
- `doc/latex/general/lshort2e.dvi`

from your `tetex` distribution (usually in

- `/usr/share/texmf` or
- `/usr/lib/texmf/texmf`).

1.3.3 $\text{pdf}\text{\LaTeX}$

Consult `doc/pdftex/manual.pdf` from your `tetex` distribution for more details. Very useful informations can be found in the `hyperref` and `graphics` package manuals:

- `doc/latex/hyperref/manual.pdf` and
- `doc/latex/graphics/grfguide.dvi`.

1.3.4 Examples

References

MIMUW

Hyperlinks

This is a target.

And [this is a link](#).

Dashes, etc.

There are three kinds of horizontal dash:

- - (use inside words; for example “home-page”, “X-rated”)
- – (use this one between numbers; for example “pages 2–22”)
- — (use this one as a sentence separator — like here)

National characters

- ó, é, í, ...
- è, à, ì, ...
- ô, ê, ...
- ã, ñ, ...
- ö, ë, ...
- ž
- å, ç
- ł, ø, ß

There are other ways to do this, see the documentation for `inputenc` package.

Reserved characters

Some characters have some special meaning, thus cannot be entered in the usual way.

- \$ & % # _ { }
- \
- ~ ^

Math

- $1^2, 1^{2n}, \dots$
- i_1, i_{2n}, \dots
- $\frac{1}{2}, \frac{2n}{2-3}, \dots$
- $\alpha, \beta, \gamma, \Omega, \dots$
- $\rightarrow, \Rightarrow, \geq, \neq, \in, \star, \dots$
- $\sqrt{2}, \dots$
- $\overline{2+2}, \dots$

For more examples and symbols see chapter 3 of `lshort2e.dvi`.

Fonts

- Roman
- *Emphasis*
- Medium weight — the default
- **Boldface**
- Upright
- *Slanted*
- Sans serif
- SMALL CAPS
- Typewriter
- and sizes:
 - tiny
 - scriptsize
 - footnotesize
 - small
 - normalsize

- large
- Large
- LARGE
- huge
- Huge