

THE PSYCHOMETRIKA L^AT_EX2E PACKAGE:

THE HOWTO FOR VERSION 2

TIM NULL

TECHNICAL EDITOR

PSYCHOMETRIKA

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Although authors are encouraged to use either Version 1 or 2 of our L^AT_EX2e packages, they are *not* required to do so.

This document attempts to serve both (a) as an explanation of how to use Version 2 of the *Psychometrika* L^AT_EX2e Package for Authors, and (b) as an example of its use. If you are anxious to get started, please skip ahead to the installation section (i.e., section 3).

In the spirit of David Thissen's 2001 Presidential Address to the Psychometric Society, *Psychometric Engineering as Art*, I should acknowledge that this package could not have been created without the *prior art* of others. First there was the original `psychometrika.cls` file created by Don DeLand of Integre Technical Publishing, then the original draft of `pmet.cls` created by Larry Hubert, and I couldn't begin to list all the little pieces modeled from examples given in various books expounding on all the multifarious nuances of L^AT_EX. To all those who have traveled this path before me, I give a nod and a tip of my hat. I have served chiefly as an editor and synthesizer, and I hope I have performed those tasks well.

Correspondence should be sent to Tim Null, Technical Editor, *Psychometrika*, P.O. Box 7104, San Jose, CA 95150-7104 U.S.A. E-Mail: tsnull@att.net or tim@nullset.org

Abstract

Guidance on installing and using Version 2 of the *Psychometrika* L^AT_EX2e Package for Authors.

Key words: software installation, “howto” file, L^AT_EX2e, templates, *Psychometrika*, IRT models, LISREL, Bayes estimates.

1. Introduction to Version 2 of the \LaTeX 2e Package

Welcome to Version 2 of the *Psychometrika* \LaTeX 2e Package for Authors. Hopefully you will find this package easy to use, and you will find these instructions helpful. Should you have any questions, suggestions, or problems, please contact me by e-mail (tsnull@att.net). Although I'm *not* a \TeX pert, and I may not be able to immediately answer your question, fix your problem, or implement your suggestion; I will be happy and delighted to hear from you, and I will do what I can to help. User input enables future refinement and improvement of this package, so please don't be hesitant about contacting me.

2. What's New in Version 2

1. With the release of Version 2 we have instituted a new version numbering system to help you quickly recognize when a package has been revised. (Note that we will continue to use and update Version 1.)
2. Unlike Version 1, which replaced the normal \LaTeX 2e article class file (i.e., `article.cls`) with its own class file (i.e., `pmet.cls`); Version 2 uses the normal \LaTeX 2e article class file combined with two packages specifically developed for *Psychometrika* (i.e., `pmetrika.sty` & `pmbib.sty`), and several other \LaTeX 2e packages (`fullpage.sty`, `ifthen.sty`, `indentfirst.sty`, & `graphicx.sty`). Template files, and all the required packages are supplied with the package.

2.1. The New Version Numbering System

Although we have now released Version 2 of the *Psychometrika* \LaTeX 2e Package for Authors, we will continue to offer Version 1. Both versions will be upgraded and revised as the need arises. In addition, to make it easy to recognize when a package has been modified, both versions will be dated to indicate the date of the latest revision, and each

version number will be followed by a letter and a number, which will be ascending as each version is updated. For example, on the date this was written, the version number for Version 2 was 2A1. The numbering sequence will then go from 2A1 through 2A9, then from 2B1 through 2B9, and so forth. This should make it easy for you to determine if the package that you use has been updated. There will also be a `readme.1st` file that will outline the revision history, and it will list the changes made in the latest revision. By glancing at the revision date combined with the version number, you should be able to quickly determine, if the package you use has been updated; and by reading the information in the `readme.1st` file, you should be able to decide if it is worth your time and trouble to download the latest revisions¹.

TABLE 1.
Version 2 components

File Name	Purpose
<code>article.tex</code>	Template for an article or note.
<code>review.tex</code>	Template for a book review.
<code>pmetrika.sty</code> [†]	Defines the appearance of the title page. Redefines the section, subsection, subsubsection, and paragraph commands. Redefines several environments, such as the theorem environment. Sets ragged right margin and 1.5 line spacing. Provides the end of proof command (i.e., <code>\qed</code>) and symbol. Provides commands for bold Greek letters. [†] Requires <code>indentfirst.sty</code> .
<code>pmbib.sty</code>	Redefines the reference section. (It can cause problems with BibTeX.)
<code>fullpage.sty</code> [‡]	Defines <code>\textheight</code> and <code>\textwidth</code> based on the paper size. [‡] © 1994 P.W. Daly; see Kopka & Daly, 1999, pp. 343–345. Requires <code>ifthen.sty</code> .

¹Unless problems are discovered in Versions 1 or 2, priority will be given to the items listed in section 2.5, rather than to additional revisions of Versions 1 and 2.

2.2. Version 2 Components

Table 1 lists the components that make up Version 2 of the *Psychometrika* L^AT_EX2e Package for Authors. Unlike Version 1, which used its own L^AT_EX2e class file (i.e., `pmet.cls`), Version 2 uses the regular L^AT_EX2e article class file (i.e., `article.cls`), combined with several `\usepackage` files that alter or add to the regular article class file. For example, the first line in a Version 1 document is

```
\documentclass{pmet};
```

whereas, the first several lines in a typical Version 2 document could include the following commands:

```
\documentclass[titlepage,12pt]{article}
\usepackage[myheadings]{fullpage}
\usepackage{pmetrika}
\usepackage{pmbib}
\usepackage[dvips]{graphicx}
```

If you use A4 paper, the first line of your file should be:

```
\documentclass[titlepage,a4paper,12pt]{article}
```

An explanation of what the above preamble commands mean, and how they effect your L^AT_EX2e output, can be found in the section of using the provided template files (i.e., section 4).

2.3. Why We Made The Change

Although only a few authors have indicated they have had problems with Version 1 of our L^AT_EX package, it has *not* been widely adopted by our authors who use L^AT_EX; so in order to promote the use of our L^AT_EX2e package among authors, I wanted Version 2 to have the following characteristics:

1. It should be easier to use than Version 1.
2. It should be as flexible, modifiable², and trouble-free as possible.
3. It should produce an attractive looking document appropriate for submission to the Editor of *Psychometrika*.

It is my hope that these goals have been reached, but if you have suggestions on how our L^AT_EX2e packages can be improved, please let me know (tsnull@att.net).

2.4. Which Version is Right for You?

You might be asking yourself, “Which version is right for me?” I would suggest that the following people might want to use or continue to use Version 1:

1. People who have used or attempted to use Version 1 in the past, and who were satisfied with the results.
2. People who like the option of being able to print a manuscript in a format that is quite similar to the final format that will appear in the journal³.

The following people might want to try Version 2:

1. People who have used Version 1, and who either had problems or who were dissatisfied with the results.
2. People who cannot resist the temptation of trying something new.
3. People who believe Version 2 generates a more attractive manuscript than Version 1 (based on this document or others they have seen).

²If you modify any of the files used in our author package, please rename the file, so your new file won't be confused with the original.

³Unfortunately this does require some editing of the template file.

4. If you have never used Version 1, I would recommend that you use Version 2.

2.5. What Is Planned for the Future

As has been mentioned, we currently offer versions 1 and 2 of our author package for L^AT_EX2e users. Eventually we hope to also offer packages (or at least templates and “howto” files) for the following users (possibly in the following order):

1. Templates for MS Word and WordPerfect users.
2. A package specifically designed to meet the special needs of Scientific Word/Scientific Workplace users.
3. Additional tweaking of the Table and Figure environments in Version 2 of the L^AT_EX2e package.
4. Example files for the L^AT_EX2e packages.
5. Develop and provide documentation for the LyX template Krishna Tateneni provided.
6. A package that will work easily with L^AT_EX 2.09.

3. Installation

Version 2 of the L^AT_EX2e package assumes that the following files are included in your L^AT_EX installation:

File Name	Purpose
<code>ifthen.sty</code>	Required by the fullpage package.
<code>indentfirst.sty</code>	Required by the pmetrika package.
<code>graphicx.sty</code>	Used to display figures.

These files (i.e., `ifthen.sty`, `indentfirst.sty`, and `graphicx.sty`) are included with most L^AT_EX installations, but just to make sure you have them, I’ve included them in the “Other Packages” subdirectory.

3.1. Quick Installation

To do a quick installation:

1. Copy the following files to your working directory: `article.tex`, `fullpage.sty`, `pmetrika.sty`, and `pmbib.sty`.
2. Rename the `article.tex` file (e.g., `ishmael.tex`).
3. Open the new file (i.e., the `article.tex` file that has been renamed) in your favorite L^AT_EX editor, and compile it to make sure everything is working (e.g., `latex ishmael`).
4. If all is well, then *commence thy tour de force*.

3.2. A More “Permanent” Installation

You will probably want to do the quick installation initially just to see if Version 2 of the package works on your system. If you make frequent contributions to *Psychometika*, or you don’t like to “clutter-up” your working directory, you will probably want to do the following installation, which will give you access to the package files from any directory. (These directions are applicable to MiKTeX Version 1.20e installed on drive C of a computer running Microsoft[®] Windows, but the general principles apply to other installations as well.)

1. In the `c:\localtexmf` directory create a directory for the package files; for example, `c:\localtexmf\tex\latex\pmetrika`.
2. Copy the following files to the directory created in Item 1: `fullpage.sty`, `pmetrika.sty`, and `pmbib.sty`.
3. Refresh the file name database for your installation of L^AT_EX. For example, the following command could be used with MiKTeX 1.20e:

```
C:\texmf\miktex\bin\initexmf.exe --mkpsres --search --update-fndb
```


4. Copy the `article.tex` template to your working directory, and rename it.
5. Open the renamed file in your favorite \LaTeX editor, do a test compile to make sure everything is working, then commence to *Begin the Beguine*.

4. Using the `article.tex` Template

In the article template you will find “comment” lines (i.e., lines which begin with one or more `%` characters) that direct you to seek further explanation in this document. For example, the first such line states

```
%%ITEM 1 [See the ‘‘howto.tex’’ file]
```

A few lines later, you’ll find

```
%%ITEM 2 [See the ‘‘howto.tex’’ file]
```

Throughout the template you’ll find eleven such lines. Each item 1 through 11 is followed by one or more lines of \LaTeX code that will need your attention. Explanations of the \LaTeX code and the entries that are needed will follow in the next several pages.

4.1. The Preamble

ITEM 1

If you use 8.5 by 11 inch paper begin your document with

```
\documentclass[titlepage,12pt]{article}
```

If you’re using A4 paper begin with

```
\documentclass[titlepage,a4paper,12pt]{article}
```

ITEM 2

Feel free to use whatever \LaTeX graphics package you usually use (e.g., `epsf`, `graphics`, `graphicx`) to include graphic files in your $\text{\LaTeX}2\epsilon$ document. I’ve set up the article

template to use the `graphicx` package, because that's the package our composition company uses, and it's the one I'm most familiar with; but there's no requirement that you use the `graphicx` package. I've included four possible commands in the preamble of the template. Two are reserved for people who use `pdfTEX`. When you want your figures included in your DVI or postscript file, you will normally use the following command:

```
\usepackage[dvips]{graphicx}
```

When viewing a dvi file, it frequently takes a long time for graphic files to be “loaded” into memory, so, while you're in the process of writing your manuscript, you will probably want to use the following command:

```
\usepackage[draft,dvips]{graphicx}
```

The “draft” option in the latter command will result in an outline of a box the size of the graphic being shown in the location where the graphic would otherwise be displayed. Your dvi files should then load quickly in your dvi viewer, and this will save a great deal of time, while you're working on the composition of your document. (For more information regarding the use of the `graphicx` package, and the inclusion of figures, see section 4.6 below.)

ITEM 3

If you've properly installed the packages (see section 3), you probably shouldn't need to alter the following lines:

```
\usepackage[myheadings]{fullpage}  
\usepackage{pmetrika}  
\usepackage{pmbib}
```

But if you use `BibTEX`, you may experience problems with the `pmbib` package. If that's the case, “comment out” the `\usepackage` line calling the `pmbib` package with an `%` symbol; that is,

```
%\usepackage{pmbib}
```

Once that has been done, your reference section will take on the characteristics that are specified in the normal article class file. You may, or may not, find that result aesthetically pleasing; but, if you're a BibTeX user, it's better than giving up your BibTeX⁴.

ITEM 4

By “default” *Psychometrika* articles do *not* have numbered sections, but authors are free to use numbered sections, if they choose. If you wish to have numbered sections, remove the % symbol in front of the `\setcounter{secnumdepth}{3}` command.

ITEM 5

In this section enter your own `\usepackage`, `\input`, and `\newcommand` entries.

4.2. The Title Page

ITEM 6

The commands in this section combine to form your title page. Some of the commands are pretty much self-evident; for example, your title is entered between the braces in the `\title{}` command. All the letters in the title will be made uppercase, so it doesn't matter how they are typed.

Type all of the author names between the braces in the

```
\markright{\MakeLowercase{\textsc{}}}
```

command, such as is shown below

```
\markright{\MakeLowercase{\textsc{H. Melville and J.F. Cooper}}}
```

⁴Someday I may figure out how to eliminate this incompatibility, and someday I may pay off my mortgage.

This will cause “H. MELVILLE AND J.F. COOPER” to appear in the header of every page, unless you enter a command to change the page style (e.g., `\thispagestyle{empty}`); therefore, the header on page 33 would look like this:

H. MELVILLE AND J.F. COOPER

33

If a manuscript has only one author, then the author’s name is typed in the `\author{}` field using upper and lowercase (e.g., `\author{Herman Melville}`); and the author affiliation is entered in the `\affil{}` field (e.g., `\affil{Pequod University}`). Use separate author and affiliation entries, except in cases where two or more authors have the same affiliation; for example, if the first and second author have the same affiliation, but the third author has a different affiliation, the first and second author names would be entered in a single `\author{}` followed by a single `\affil{}` field, and the third author’s name and affiliation would be entered in separate `\author{}` and `\affil{}` fields. The names and affiliation would appear on the title page like this:

DOROTHY PARKER AND WILLIAM FAULKNER

UNIVERSITY OF ALGONQUIN

JAMES FENIMORE COOPER

LEATHERSTOCKING INSTITUTE

There are three additional commands unique to the title page: `\comment`, `\thanks`, and `\contact`. All three do the same thing; that is, they create an unnumbered footnote near the bottom of the title page. You could use just one of the commands several times, but I’ve created three commands just to make it easy to conceptually organize the footnotes on the title page. The “comment” command is for statements like: *This research was funded by my Aunt Josephine*. The “thanks” command is a modification of the `\thanks{}` command already present in L^AT_EX, and it is used for statements like: *I would very much like to thank my Aunt Josephine*. The “contact” command gives you a place to

list things like your mailing and e-mail addresses. (These commands are similar to the `\footnotetext{}` command, in that they should ***not*** be used within other commands, such as `\author{}` or `\title{}`.)

4.3. *The Abstract Page*

ITEM 7

The `\abstracthead` command gives the abstract its heading. You will need to enter your abstract in the space between the `\begin{abstract}`, and the `\begin{keywords}` commands. Then enter your key words in the space between the `\begin{keywords}` and the `\end{keywords}` commands. Except for items like acronyms and proper names, the key words should be in lowercase. (See the key words in this manuscript for examples.)

4.4. *The Body of the Manuscript*

ITEM 8

The main body of your manuscript and appendices (if you have any) go between the abstract and reference pages. Your Tables and Figures should go after the reference section, but you will need to mark the *approximate* location where you wish your tables and figures placed. (Since tables and figures are “floats” the actual location may be slightly before or after the location you indicate.) Version 2 of our $\text{\LaTeX}2\text{e}$ package provides a “tablehere” and “figurehere” command to make it very easy for you to mark the approximate location for your tables and figures. (See the next paragraph for a description of these commands.)

A couple new commands. The pmetrika package defines new commands to indicate the approximate location of your tables and figures. The command `\tablehere{}` can be used to mark the location of a table. The command `\figurehere{}` can be used to mark the location of a figure. For example, the command `\tablehere{1}` would mark the location

for Table 1 as shown below:

```
=====
Insert Table 1 about here
=====
```

The command `\figurehere{5}` would mark the location for Figure 5, as shown below:

```
=====
Insert Figure 5 about here
=====
```

`\ref{}` commands can also be used, rather than entering a specific figure or table number; for example, in this manuscript `\figurehere{\ref{textwidth}}` would result in

```
=====
Insert Figure 2 about here
=====
```

For additional information about figures, see section 4.6.

Section headings. In *Psychometrika* there are three types of main headings used, and a paragraph heading. Examples are given below:

This is a Section Heading

Section headings are centered, Roman⁵, with long and major words capitalized.

This is a Subsection Heading

Subsection headings are centered, italic, with long and major words capitalized.

⁵Although I've chosen to use boldface for the L^AT_EX2e section headings, in the journal they are Roman (i.e., normalfont, not italic or bold).

This is a Subsubsection Heading

Subsubsection headings are flushleft, italic, with long and major words capitalized.

This is a paragraph heading. Paragraph headings are composed of a single word or a short phrase. The word or phrase is followed by a period. Paragraph headings are italic with only the first letter of the first word capitalized (except for acronyms and proper names, of course).

ITEM 9

Appendices. Item 9 is followed by a number of commands, which—if you have one or more appendices—you can “activate” by removing the % at the front of the line. If you only have one appendix, you should remove the % character in front of the following lines:

```
\appendix
\renewcommand{\theequation}{A\arabic{equation}}
\setcounter{equation}{0}
\renewcommand{\thesection}{\Alph{subsection}}
\setcounter{section}{0}
\section*{Appendix}
%\section*{Appendix A}
%\section*{Appendix B}
```

If you only have two appendices, you should remove the % character in front of the following lines:

```
\appendix
\renewcommand{\theequation}{A\arabic{equation}}
\setcounter{equation}{0}
\renewcommand{\thesection}{\Alph{subsection}}
\setcounter{section}{0}
%\section*{Appendix}
\section*{Appendix A}
\section*{Appendix B}
```

(Of course the text for Appendix A and Appendix B would follow the respective headings.) If then you added a third and forth appendix, they would have the following section headings:

```
\section*{Appendix C}
```

```
\section*{Appendix D}
```

4.5. The Reference Section

ITEM 10

You shouldn't have to do anything special or different in the reference section. Just start each item with either `\bibitem□` or `\item□` (where the “_□” symbol stands for a blank space), and then enter your bibliographic information as you would normally. The `pmbib` package should be able to format the lines correctly for you. (If you have a problem with `pmbib`, I may be able to help; unless, of course, the problem is due to a conflict with `BibTeX`.) If you have stylistic questions, consult the *APA Publication Manual*.

4.6. Figures and Tables

ITEM 11

When it comes to things like figures and tables, I find examples more helpful than 10,000 words, so I encourage you to check out the examples that follow the reference section.

The `pmetrika` package defines a new command for spacing between figures (i.e., `\figskip`).

5. New Commands

5.1. End of Proof Symbol (`\qed`)

The bad news. The “`qed`” command may be incompatible with the “subequation” and “subeqnarray” packages; and if you use the “fleqn” package, fleqn must be loaded after the pmetrika package. Also, the `\qed` command cannot be used within `\[...]` environments.

The good news. The `\qed` command provides the end of proof symbol. To see how it works, please review the following *spoof-proof*:

Proof. It’s obvious. □

5.2. Boldface Greek Letters

Command	Result
<code>\$(\bfAlpha\$</code>	A
<code>\$(\bfBeta\$</code>	B
<code>\$(\bfPsi\$</code>	Ψ
<code>\$(\bfDelta\$</code>	Δ
<code>\$(\bfEpsilon\$</code>	E
<code>\$(\bfPhi\$</code>	Φ
<code>\$(\bfGamma\$</code>	Γ
<code>\$(\bfEta\$</code>	H
<code>\$(\bfIota\$</code>	I
<code>\$(\bfXi\$</code>	Ξ
<code>\$(\bfKappa\$</code>	K
<code>\$(\bfLambda\$</code>	Λ
<code>\$(\bfMu\$</code>	M
<code>\$(\bfNu\$</code>	N
<code>\$(\bfPi\$</code>	Π
<code>\$(\bfTheta\$</code>	Θ
<code>\$(\bfRho\$</code>	R
<code>\$(\bfSigma\$</code>	Σ

Command	Result
<code>\$\bfTau\$</code>	T
<code>\$\bfVartheta\$</code>	Θ
<code>\$\bfOmega\$</code>	Ω
<code>\$\bfVarpi\$</code>	No Varpi in Computer Modern Bold
<code>\$\bfUpsilon\$</code>	Υ
<code>\$\bfZeta\$</code>	Z
<code>\$\bfalpha\$</code>	α
<code>\$\bfbeta\$</code>	β
<code>\$\bfchi\$</code>	χ
<code>\$\bfpsi\$</code>	ψ
<code>\$\bfdelta\$</code>	δ
<code>\$\bfepsilon\$</code>	ε
<code>\$\bfphi\$</code>	φ
<code>\$\bfgamma\$</code>	γ
<code>\$\bfeta\$</code>	η
<code>\$\bfiota\$</code>	ι
<code>\$\bfxi\$</code>	ξ
<code>\$\bfkappa\$</code>	κ
<code>\$\bflambda\$</code>	λ
<code>\$\bfmu\$</code>	μ
<code>\$\bfnu\$</code>	ν
<code>\$\bfpi\$</code>	π
<code>\$\bftheta\$</code>	θ
<code>\$\bfrho\$</code>	ρ
<code>\$\bfsigma\$</code>	σ
<code>\$\bftau\$</code>	τ
<code>\$\bfvartheta\$</code>	ϑ
<code>\$\bfomega\$</code>	ω
<code>\$\bfvarpi\$</code>	ϖ
<code>\$\bfvarphi\$</code>	φ
<code>\$\bfupsilon\$</code>	υ
<code>\$\bfzeta\$</code>	ζ

For other boldface characters in math mode, please use the **mathbf** command (i.e., `\mathbf{}`) rather than the *boldmath* command (i.e., `\boldmath{}`), so that you don't end up combining *italic* and **boldface** like ***this***.

5.3. Miscellaneous New Commands

Below I have listed the new commands created by the pmetrika package in the table shown below⁶.

Command	Result
<code>\abstracthead</code>	see section 4.3
<code>\comment</code>	see section 4.2
<code>\contact</code>	see section 4.2
<code>\figskip</code>	Vertical space between figures.
<code>\figurehere</code>	see section 4.4
<code>\linespacing{}</code>	Change <code>baselinestretch</code> to specified number
<code>\longpage</code>	Increase <code>\textheight</code> by 1 <code>\baselineskip</code> .
<code>\qed</code>	see section 5.1
<code>\shortpage</code>	Decrease <code>\textheight</code> by 1 <code>\baselineskip</code> .
<code>\tablehere</code>	see section 4.4
<code>\thanks</code>	see section 4.2

⁶Please note that the following “newtheorems” have already been defined in the pmetrika package: assumption, axiom, corollary, definition, example, exercise, lemma, remark, proposition, and theorem.

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Note: Include your figures and tables after the reference section.

Figures



FIGURE 1.

The *Psychometrika* logo. This is the same as the scale being equal to 1.



FIGURE 2.

The *Psychometrika* logo with a width set to equal to the width of the page.



FIGURE 3.

The *Psychometrika* logo with scale set equal to 0.5.



FIGURE 4.
The *Psychometrika* logo rotated 90 degrees with width equal to 2.5 inches.



FIGURE 5.
The *Psychometrika* logo rotated with scale set equal to 0.2.



FIGURE 7.
A figure with both the graphic and caption rotated.



FIGURE 6.
A figure with both the graphic
and caption rotated.

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FIGURE 8.

A figure with both the graphic and caption rotated.