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Contribution of SPSS in Social Sciences Research

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Abstract- The aim of the present study is to throw some light on the revolutionary contribution of SPSS in current social sciences research. SPSS (Statistical Package for the Social Sciences) is a widely used program for statistical analysis in social science. Computer technology has permeated every phase of research and experimentation in the social sciences; and within related fields such as business and education, the computer has become an indispensable tool, from marketing research and consumer behavior to trend analysis and forecasting. Clearly, it is this single aspect of computing that has enabled social scientists to grasp the truly complex nature of human behavior and social organizations. Nevertheless, social scientists have come to involve the computer in nearly every component of their research, from the literature search, to the implementation of experiments, and to the writing of the manuscript on a word processor. The capability of SPSS is truly astounding. SPSS is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary was stored in the data file) are features of the base software. The package enables the researchers to obtain statistics ranging from simple descriptive numbers to complex analyses of multivariate matrices along with plotting the data in histograms, scatter plots, and other ways. The SPSS has reduced the requirement for researchers to be able to undertake several of the calculations that area unit needed for applied math analyses. Researchers collect massive quantities of knowledge, from surveys, experiments and different types of observation. An applied math computing package provides a convenient means that to store this information, and derive descriptive and inferential statistics. The applied math Package for the Social Sciences (SPSS) could be a wide used all-purpose survey analysis package, and therefore a helpful one to master.

Keywords: SPSS, Social Sciences, Research, Data

INTRODUCTION

Researchers collect massive quantities of knowledge, from surveys, experiments and different types of observation. Computer technology has permeated every phase of research and experimentation in the social sciences; and within related fields such as business and education, the computer has become an indispensable tool, from marketing research and consumer behavior to trend analysis and forecasting. Clearly, it is this single aspect of computing that has enabled social scientists to grasp the truly complex nature of human behavior and social organizations. Nevertheless, social scientists have come to involve the computer in nearly every component of their research, from the literature search, to the implementation of experiments, and to the writing of the manuscript on a word processor. The capability of SPSS is truly astounding. SPSS is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary was stored in the data file) are features of the base software. The package enables the researchers to obtain statistics ranging from simple descriptive numbers to complex analyses of multivariate matrices along with plotting the data in histograms, scatter plots, and other ways. The SPSS has reduced the requirement for researchers to be able to undertake several of the calculations that area unit needed for applied math analyses. Researchers collect massive quantities of knowledge, from surveys, experiments and different types of observation. An applied math computing package provides a convenient means that to store this information, and derive descriptive and inferential statistics. The applied math Package for the Social Sciences (SPSS) could be a wide used all-purpose survey analysis package, and therefore a helpful one to master. SPSS offers a user friendliness that most packages are only now catching up to. Many data sets are easily loaded into it and other programs can easily import SPSS files.

WHAT IS SPSS?

SPSS Statistics is a software package used for statistical analysis. The software was released in its first version in 1968 as the Statistical Package for the Social Sciences (SPSS) after being developed by Norman H. Nie, Dale H. Bent, and C. Hadlai Hull. Those principals incorporated as SPSS Inc. in 1975. Early versions of SPSS Statistics were designed for batch processing on mainframes, including for example IBM and ICL versions, originally using punched cards for input. From version 10 (SPSS-X) in 1983, data files could contain multiple record types. SPSS Statistics versions 16.0 and later run under Windows, Mac, and Linux. The graphical user interface is written in Java. The Mac OS version is provided as a Universal binary, making it fully compatible with both PowerPC and Intel-based Mac hardware. Prior to SPSS 16.0, different versions of SPSS were available for Windows, Mac OS X and Unix. The Windows version was updated more frequently and had more features than the versions for other operating systems. Long produced by SPSS Inc., it was acquired by IBM in 2009. The current versions (2015) are officially named **IBM SPSS Statistics**. Companion products in the same family are used for survey authoring and deployment (IBM SPSS Data Collection), data mining (IBM SPSS Modeler), text analytics, and collaboration and deployment (batch and automated scoring services). **SPSS** consists of an integrated series of computer programs which enable the user to read data from questionnaire surveys and other sources (e.g. medical and administrative records) to manipulate them in various ways and to produce a wide range of statistical analyses and reports, together with documentation.

Role of SPSS in Social Sciences Research

In research, data collected is analyzed to test the hypothesis assumed. In research process, maximum amount of data is collected so that the researcher can draw a concrete and error free conclusion. Undoubtedly, the analysis of a large quantum of data is a very critical task, so software is used to analyze the data collected. The software **Statistical Package for the Social Sciences (SPSS)** is a widely used program for statistical analysis in social science. It is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. Practical knowledge of SPSS in the research field, knowledge of the commands (data view and variable view, compute, select cases-filtering data, split file, sorting data, visual binning, recode variables, merge files, commands for import and export of data in SPSS) of this software is required. There would be wastage of resources and efforts in collecting the data, if data is not analysed efficiently. There are some statistical tools for analysing data.

Statistics included in the base software:

- Descriptive statistics: Cross tabulation, Frequencies, Descriptives, Explore, Descriptive Ratio Statistics
- Bivariate statistics: Means, t-test, ANOVA, Correlation (bivariate, partial, distances), Nonparametric tests
- Prediction for numerical outcomes: Linear regression
- Prediction for identifying groups: Factor analysis, cluster analysis (two-step, K-means, hierarchical), Discriminant
- Inferential applied math Analysis which involves the method of sampling, the choice for study of a tiny low cluster that's assumed to be associated with the massive cluster from that it's drawn.

In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary was stored in the data file) are features of the base software. There is a fully detailed guide to SPSS tutorials containing all the contents of all the main menus, but this may not be up-to-date. There are more than 600 pages (90 mb) of downloadable tutorials and supporting materials. While using SPSS in research, the researcher with mathematical skills is not required, but the researcher should be proficient in understanding research — or more accurately, the statistical concepts underlying research. Learning statistical concepts is no different to learning about any other concepts (such as learning to use the Internet).

There are some important concepts while managing the data in SPSS. If these concepts are clear to researcher then the software of SPSS is quiet easy to use. SPSS software works hard to keep the researchers from running into the ditch. SPSS always begin by defining a set of *variables*, and then entering data for the variables to create a number of *cases*. The first step is to identify the variables.

Types of variables:

- Independent variables – the cause supposed to be responsible for the bringing about change in a phenomenon or situation.
- Dependent variables – the outcome of change brought about by change in the independent variable
- Intervening variable – a variable whose existence is inferred but cannot be manipulated or controlled
- Moderator variable – a variable that may or may not be controlled but has an effect on the research situation/phenomenon.

For example:

Does a commitment to ethics among media practitioners depend on their educational or professional training?

- Independent variable: educational attainment of journalist.
- Dependent variables: ethical behavior, knowledge of Code of Ethics
- Intervening variable: newsroom policies
- Moderator variables: civil status, age, years of work experience

Quantification of Variables

After identifying the variable, the next step is the quantification of variables by measurement. Measurement is the application of rules in assigning numbers to cases so as to represent the presence or absence of quantity of an attribute possessed by each case.

Scales of Measurement

- **Nominal Scale Measurement (Lowest):** Nominal is just a descriptive name - no value, no ranking - like colors (red, blue, yellow) or gender (male, female) and are mutually exclusive (for the purposes of the study). "Categorical" Race (African American, Asian American, Latino/a, Caucasian) Marital status (single never married, married, divorced, etc)
- **Ordinal Scale Measurement:** Ordinal - ranked highest to lowest. Cities ranked by size of population. Baseball players ranked by batting average.
- **Interval Scale Measurement:** Interval scale of measurement - "Continuous variable" in which a number is assigned to the amount of an attribute and IN WHICH ZERO DOES NOT MEAN THE ABSENCE OF THE ATTRIBUTE - like temperature - 0 does not mean there is not temperature. Test scores - zero doesn't mean the absence of intelligence/knowledge.
- **Ratio Scale Measurement (Highest):** Ratio scale - "Continuous variable" in which a number is assigned to the amount of an attribute and IN WHICH ZERO HAS A MEANING - like in the amount of money in your pocket - you can't go below zero. Number of children, amount of food you have, height, weight, age...

- Variables measured at higher levels can be scaled down to lower levels: "Variables measured at higher levels can be scaled down to lower levels" : you can rank or name ratio or interval scales, making them ordinal or nominal, but not vice versa. You can do more statistical processes with the "higher" level variables.

Study Designs:

And finally, there are two major study designs that are often used in research.

- The first one is known as the between-participants design or unrelated design. With this approach, the researcher compares two or more separate groups of people.
- Another popular way to conduct research, especially in the field of usability, is to use the same group of people over and over again to measure different things or to measure the same thing at different time points. This is known as the within-participants design or a related design.

It is important to note that study design can get more complex, when researcher has two or more independent variables in the same study. Then he/she has a mixed design, with one variable using an unrelated design and another using a related design. As long as researcher understands the basic distinction between unrelated and related designs, it should be easy to describe and understand researcher's own research. The task of a researcher is to first figure out what analyses should be performed, on the basis of variables, measures and study design. After data is entered into SPSS, cases are all defined by values stored in the variables, now it's the time to run an analysis. Running an analysis on the data is much easier than entering the data. To run an analysis, select the one you want to run from the menu, select appropriate variables, and click the OK button. SPSS reads through all your cases, performs the analysis, and presents with the output. SPSS can draw graphs and charts according to instructions to do an analysis. All output from SPSS goes to the same place — a dialog box named SPSS Viewer. It opens to display the results of whatever you've done.

FEATURES OF SPSS

- **Computer based quantitative analysis package:** SPSS is a desktop and larger computer based quantitative analysis package produced by SPSS Inc. Using SPSS you can perform many data management and statistical analysis tasks. With base SPSS a researcher can manage data with ease

selection, file reshaping, and creating derived data. A metadata dictionary is stored with the data. Statistical analysis tasks that can be performed with the base package include the generation of descriptive statistics, bivariate statistics, prediction of numerical outcomes, and prediction of identifying groups. Although SPSS is very popular with social science researchers, its ease of use and add on modules allows it to operate as a cross-disciplinary software package.

- **Command syntax language** The many features of SPSS Statistics are accessible via pull-down menus or can be programmed with a proprietary 4GL *command syntax language*. Command syntax programming has the benefits of reproducibility, simplifying repetitive tasks, and handling complex data manipulations and analyses. Additionally, some complex applications can only be programmed in syntax and are not accessible through the menu structure. The pull-down menu interface also generates command syntax: this can be displayed in the output, although the default settings have to be changed to make the syntax visible to the user. They can also be pasted into a syntax file using the "paste" button present in each menu. Programs can be run interactively or unattended, using the supplied Production Job Facility.
- **Macro Language:** Additionally a "macro" language can be used to write command language subroutines. SPSS Statistics places constraints on internal file structure, data types, data processing, and matching files, which together considerably simplify programming. SPSS datasets have a two-dimensional table structure, where the rows typically represent cases (such as individuals or households) and the columns represent measurements (such as age, sex, or household income). Only two data types are defined: numeric and text (or "string"). All data processing occurs sequentially case-by-case through the file. Files can be matched one-to-one and one-to-many, but not many-to-many.
- **Two types of Views:** The graphical user interface has two views which can be toggled by clicking on one of the two tabs in the bottom left of the SPSS Statistics window. The 'Data View' shows a spreadsheet view of the cases (rows) and variables (columns). Unlike spreadsheets, the data cells can only contain numbers or text, and formulas cannot be stored in these cells. The 'Variable View' displays the

metadata dictionary where each row represents a variable and shows the variable name, variable label, value label(s), print width, measurement type, and a variety of other characteristics. Cells in both views can be manually edited, defining the file structure and allowing data entry without using command syntax. This may be sufficient for small datasets. Larger datasets such as statistical surveys are more often created in data entry software, or entered during computer-assisted personal interviewing, by scanning and using optical character recognition and optical mark recognition software, or by direct capture from online questionnaires. These datasets are then read into SPSS.

- **More capacity of read and write data:** SPSS Statistics can read and write data from ASCII text files (including hierarchical files), other statistics packages, spreadsheets and databases. SPSS Statistics can read and write to external relational database tables via ODBC and SQL. Statistical output is to a proprietary file format (*.spv file, supporting pivot tables) for which, in addition to the in-package viewer, a stand-alone reader can be downloaded. The proprietary output can be exported to text or Microsoft Word, PDF, Excel, and other formats. Alternatively, output can be captured as data (using the OMS command), as text, tab-delimited text, PDF, XLS, HTML, XML, SPSS dataset or a variety of graphic image formats (JPEG, PNG, BMP and EMF).

Limitations

Imported .csv files may not contain variables in the appropriate numerical format for SPSS, particularly if these have been exported from another application such as MOLE.

CONCLUSION

SPSS (**Statistical Package for the Social Sciences**) is a widely used program for statistical analysis in social science. Nevertheless, social scientists have come to involve the computer in nearly every component of their research, from the literature search, to the implementation of experiments, and to the writing of the manuscript on a word processor. The capability of SPSS is truly astounding. SPSS is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary was stored in the data file) are features of the base software. The

package enables the researchers to obtain statistics ranging from simple descriptive numbers to complex analyses of multivariate matrices along with plotting the data in histograms, scatter plots, and other ways. Researchers collect massive quantities of knowledge, from surveys, experiments and different types of observation. The applied math Package for the Social Sciences (SPSS) could be a wide used all-purpose survey analysis package. Nowadays, it is actually possible to think of **statistics** as being slightly different from **mathematics**. In recent time research data analysis is not done by hand. With the arrival of data analysis programmes such as SPSS, good mathematical skills are no longer needed. If one can add, subtract, divide and multiply, and computer literate, one can easily learn how to do statistical analyses using SPSS.

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