**SR 958-52: Research Design and Methodology III**

**(Spring 2025, Subterm A)**

**Assignment #2: Developmental Reading**

**Dr. Peter Abraham Airewele DSL**

**Omega Graduate School**

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**Professor**

**Dr. Sean Taladay EdD**

**2. Developmental Reading**

Assignment #2 – Developmental Readings

1. Create Developmental Readings from seminal sources and scholarly peer-reviewed

journal articles. Review instructions for Assignment #3, the course essential elements,

and course readings to identify selections of books and journals to create entries.

a. Refer to the "Student Guide to Developmental Readings" in the General

Helps folder for updated information on sample comments, the grading rubric,

and key definitions related to developmental readings.

**Introduction**

Given the nature and the use of statistical sampling in research design and methodology, this study takes a critical look at the snowball sampling in recruitment. It will verify and assess how well it can mobilize the digital and the internet social media networking to facilitate the recruitment process often associated with it. Perhaps seek answers as to why Snowball Sampling relies on social networking and referrals to build samples. And why it usually starts with a few participants and gradually grows organically (Pretorius, 2025) and has some bias. The purposive sampling will be assessed to determine how and why it is feasible to engage in it. Moreover, find out if its better matching of the sample, regarding the aims and objectives of the research, thus improving the rigour of the study and trustworthiness of the data and result (Campbell, et al., 2020). Other areas of interest are the Convenience Sampling, seen as most effective when adequate motivational factors are in place and seen as non-probability sampling that is often used for clinical and qualitative research around a location (such as hospital), medical records database, Internet site, or customer-membership list (Stratton, 2021; Pretorius, 2025), if any bias is associated with them. The process of inclusion and exclusion of participants in statistical studies often raise eyebrows with third party members or stakeholders. While some see it as some forms of discrimination, some see it important when recruiting study participants, especially in clinical and behavioral research studies (ICORD, 2025) in multi-purpose project experiments and sampling surveys. The researcher’s shift from procedural norms to social scientific discipline and method-based principles and software (Masso et al, 2025), will be examined. Research ethics are critical to establishing project validity and integrity (Resnik, 2015). They constitute the prima facies, and the basis of any statistical projects for their credibility and integrity.

**Source One:**Pretorius, L. (2025). Participants Recruitment Strategies in Research. Monash

University, Australia. https://www.lynettepretorius.com/the\_scholars\_way\_blog/

participant-recruitment-strategies-in-research/.

**Comment 1:**The digital and the internet social media networking tend to facilitate the snowballing recruitment process.

**Quote/Paraphrase:**Snowball Sampling relies on social networking and referrals to build samples. It usually starts with a few participants and gradually grows organically, involving more participants, and it is best with hard-to-reach populations. It is most effective when using traditional methods. It is not recommended due to its propensity for bias in participants’ selection. Familiarity with participants may create some bias unless there is trust among the participating participants and peers. It can limit diversity and inclusion when the participants are not revealing enough data and information (Pretorius, 2025).

**Essential Elements:** Snowball Sampling , social networking and referrals, grows organically, involving more participants, traditional methods, propensity for bias in participants’ selection, Familiarity with participants, and peers, diversity and inclusion, enough data and information.

**Additive/Variant Analysis:**The variant is, “Snowball Sampling can limit diversity and inclusion when the participants are not revealing enough data and information” for consideration. Meanwhile, the additive is, “Snowballing relies on social networking and referrals to build samples. It usually starts with a few participants and gradually grows organically, involving more participants, and it is best with hard-to-reach populations.” The disconnect in snowball sampling is insufficient data and information from the participants including the researchers. The remedy is to provide enough data and information to guide and facilitate the process of recruitment. Moreover, there must be the skill capacity to carry out such recruitment.

**Comment 2:** Convenience Sampling is most effective when adequate motivational factors are in place.

**Quote/Paraphrase:** Convenience sampling is non-probability sampling that is often used for clinical and qualitative research around a location (such as hospital), medical records database, Internet site, or customer-membership list.

Convenience sampling for qualitative research depends on the motivation of those who participate in the research. This introduces motivation bias into the study. Motivation to participate may depend upon the interest one has in the research topic, a wish to express a disgruntled point of view, or desire to support one’s specific opinions. Convenience sampling is popular because it is not costly, not as time-consuming as other sampling strategies, and simplistic. When used to generate a potential hypothesis or study objective, convenience sampling is useful. Despite the limitations of convenience sampling, there are steps that can be taken to improve credibility of this popular and simple method (Stratton, 2021).

**Essential Elements:** Convenience sampling, non-probability sampling, qualitative research, medical records database, Internet site, customer-membership list, motivation bias, research topic, disgruntled point of view, sampling strategies, potential hypothesis, or study objective. Table 1.1 further reveals that convenient sampling can be best served when there is no complex objective set in the process of statistical survey.

**Additive/Variant Analysis:** The additive is, “Motivation to participate may depend upon the interest one has in the research topic, a wish to express a disgruntled point of view, or desire to support one’s specific opinions.” This implies that successful motivation in convenient sampling is dependent on the solid interest of the participants, freedom, and the statistical power of expression.

**Table 1. Methods to Improve Dependability of Convenience Sampling**



**Table 1.1** is culled from Population Research: Convenience Sampling Strategies (Stratton, 2021) Cambridge University Press 2025.

**Contextualization:**Convenient sampling is effective when the researchers and participants are concise in their set objectives, and the methods and process are clarified. About 80% participation is required to ensure sampling credibility. Moreover, the participants’ demographics should match or reflect the targeted or potential population being considered in the sampling.

**Source Two:** ICORD (2025) Inclusion & exclusion criteria explained. Vancouver Coastal

Health Research Institute. UBC Faculty of Medicine.

**Comment 3:**Inclusion and exclusion criteria are important when recruiting participants in sampling surveys and project experiments.

**Quote/Paraphrase:** At ICORD, clinical and behavioral research studies are conducted that involve human volunteers (participants) to expand knowledge and help gather added information on a specific question or field of study. Inclusion criteria are the factors that allow a person to participate in a study, whereas exclusion criteria are the factors that disqualify a person from participating. Choosing criteria is important because it ensures participants provide the necessary information to address research questions. When researchers select criteria, they do their best to ensure the rigor and validity of study findings while also maintaining participant safety. Therefore, one study may include participants who were excluded from another study. This does not indicate that the criteria are unethical but instead that the purposes of the studies are different (ICORD, 2025).

**Essential Element:** At ICORD, clinical and behavioral research, human volunteers (participants), Inclusion criteria, Eligibility criteria, inclusion, and exclusion criteria, maintaining participant safety, unethical.

**Additive/Variant Analysis:** The additive is, “When researchers select criteria, they do their best to ensure the rigor and validity of study findings while also maintaining participant safety. This does not indicate that the criteria are unethical but instead that the purposes of the studies are different.” ICORD reminds us of the fact that participants selection, inclusion and exclusion are based on participant safety, the right participant selection, and the right collage of demographic representation. These factors constitute the basis for effective sampling.

**Contextualization:** Inclusion and exclusion methods are not based on bias selection. Instead, they are based on adequate demographical representation. Sampling exclusion does not imply discrimination. It simply means the researcher engages the right people that fit the project or program statistical survey requirements.

**Comment 4:** Purposive sampling is based on matching the sampling to the objectives and goals of the research.

**Quote/Paraphrase:** The reason for purposive sampling is the better matching of the sample to the aims and objectives of the research, thus improving the rigour of the study and trustworthiness of the data and results. Four aspects to this concept have previously been described: credibility, transferability, dependability, and confirmability (Campbell, et al., 2020).

**Essential Elements:** Purposive sampling, matching sample, the aims and objectives of the research, the study and trustworthiness of the data and results. Four aspects to this concept have previously been described: credibility, transferability, dependability, and confirmability

**Additive/Variant Analysis:** The additive is “Purposive sampling, matching sample, the aims and objectives of the research, the study and trustworthiness of the data and results.” These criteria tend to set Purposive sampling apart. They signify the high standard requirements. Other compelling factors are purposive sampling dependability and confirmability.

**Contextualization:**  The trustworthiness factor provides the basis for the validity of purposive sampling data and information. This creates a sense of credibility. The third party, usually the public or stakeholders, have confidence in purposive sampling when they find the research data and information dependable.

 **Source Three:**Masso, A., Gerassimenko, J., Kasapoglu, T., & Biemann, M. (2025). Research

Ethics Committees as Knowledge Gatekeepers: The Impact of Emerging Technologies on Social Science Research. *Journal of Responsible Technology*, 100112.

**Comment 5:** The researcher’s shift from procedural norms to social scientific discipline and method-based principles have its consequences.

**Quote/Paraphrase:** This transformation acknowledges social science research's unique challenges and opportunities, such as digital data, algorithms, and artificial intelligence. Our empirical analysis highlights the precariousness researchers face regarding these technological shifts. Traditional methods remain prevalent despite the recognition of new digital methodologies that necessitate new ethical principles Masso et al. (2025 (Abstract).

**Essential Element:** Evolution of research ethics, shift from procedural norms to social scientific discipline, transformation, unique challenges and opportunities, digital data, algorithms, and artificial intelligence, empirical analysis, precariousness, researchers face, technological shifts, traditional methods, digital methodologies, ethical principles.

**Additive/Variant Analysis:** The variant is, “Traditional methods remain prevalent despite the recognition of new digital methodologies that necessitate new ethical principles.” The traditional statistical methods of problem solving is gradually overtaken by statistical software and tools like the SPSS—short for Statistical Package for the Social Sciences— for data analysis tools and informative graphs from extensive piles of data, streamlining the interpretation process. The other is MATLAB, one of the best-known computer languages and statistical software for engineering and data sciences (Kuo, 2024).

**Contextualization:** At some point, academia and scholars should incorporate traditional methods into the digital methodology. The digital mode of learning is time and cost effective. Statistical software has the capacity to process complex statistical data at a short pace of time, compared to traditional, mechanistic computations.

**Comment 6:**Research ethics are critical to establishing the project validity and integrity.

**Quote/Paraphrase:**Given the importance of ethics for the conduct of research, it should come as no surprise that many different professional associations, government agencies, and universities have adopted specific codes, rules, and policies relating to research ethics. Many government agencies have ethics rules for funded researchers. Objectivity: Strive to avoid bias in experimental design, data analysis, data interpretation, peer review that may affect research (Resnik, 2015).

**Essential Elements:**  Ethics, conduct of research, professional associations, government agencies, and universities codes, rules, and policies, objectivity: Strive to avoid bias in experimental design, data analysis, data interpretation, peer review that may affect research.

**Additive/Variant Analysis:** The additive is, “Strive to avoid bias in experimental design, data analysis, data interpretation, peer review that may affect the research.” Any statistical research that lacks bias is embraced and has credibility. Research ethical standards should be binding on the researchers (academia), and the stakeholders (academia, government, and corporate organizations. Including the public (who are consumers) demanding realistic, factual data and information that uphold transparency and the integrity of research communication.

**Contextualization:**  Some of the potential risk factorsassociated with collecting data from human participantsincludethe breach of privacy and confidentiality, social and physical harm, especially the harm from loss of autonomy or research rights to certain data and information. Research ethics must exemplify the guardrails of ethical standards and discipline. Such ethics must demonstrate some informed consent backed by some privacy and copyright regulations and at the same time eradicate and minimize the potential harm and risk factors associated with such research conducted.

**Source Four:**Bhandari, P. (2020, 2023). Population vs Sample / Definitions,

Differences & Examples. Population vs. Sample | Definitions, Differences & Examples Published on May 14, 2020, by Pritha Bhandari. Revised on June 21, 2023. https://www.scribbr.com/methodology/population-vs-sample/

**Comment 7:**The difference between a targeted population and a population sample reveals their statistical data characteristic features.

**Quote/Paraphrase:**A **population**is an entire group that you want to draw conclusions about. A **sample** is the specific group that you will collect data from. The size of the sample is always less than the total size of the population. In research, the population does not always refer to people. It can mean a group containing elements of anything you want to study, such as objects, events, organizations, countries, species, organisms, etc. Using [probability sampling](https://www.scribbr.com/methodology/probability-sampling/) methods (such as [simple random sampling](https://www.scribbr.com/methodology/simple-random-sampling/) or [stratified sampling](https://www.scribbr.com/methodology/stratified-sampling/)) reduces the risk of [sampling bias](https://www.scribbr.com/research-bias/sampling-bias/) and enhances both [internal](https://www.scribbr.com/methodology/internal-validity/) and validity. Because of non-random selection methods, any statistical inferences about the broader population will be weaker than with a probability sample (Bhandari, 2020, 2024

| Population | Sample |
| --- | --- |
| Advertisements for IT jobs in the Netherlands | The top 50 search results for advertisements for IT jobs in the Netherlands on May 1, 2020 |
| Songs from the Eurovision Song Contest | Winning songs from the Eurovision Song Contest that were performed in English |
| Undergraduate students in the Netherlands | 300 undergraduate students from three Dutch universities who volunteer for your psychology research study. |
| All countries of the world | Countries with published data available on birth rates and GDP since 2000 |

 **Population vs Sample Table 4.1**

* Table 4.1 is culled from www.scribbr.com. Bhandari, P. (2020, 2023).

**Essential Elements:** P**opulation,** **sample, s**pecific group, data, size of the sample, total size of the population,  [non-probability sampling](https://www.scribbr.com/methodology/non-probability-sampling/) methods. Non-probability samples, [probability sampling](https://www.scribbr.com/methodology/probability-sampling/) methods, [simple random sampling](https://www.scribbr.com/methodology/simple-random-sampling/) or [stratified sampling](https://www.scribbr.com/methodology/stratified-sampling/), risk of [sampling bias](https://www.scribbr.com/research-bias/sampling-bias/), statistical inferences.

**Additive/Variant Analysis:**The additive is, “A **population**is an entire group that you want to draw conclusions about. A **sample** is the specific group that you will collect data from.” The population and sample statistics are the most practiced aspect of statistics. Population is a generic word, it refers to groups of people, groups of items like songs, schools, students, etc. (See table 4.1 above).

**Contextualization:**  A target population denotes the whole group of people. They include things, or events, that the researcher is interested in studying and can assume, or draw assumptions, inferences, and perhaps some conclusions in the process of the study. Meanwhile, a sample is a subgroup, or subset, or subclass of the group from which the researcher makes the data selection and analysis about the greater or bigger targeted populace.

**Comment 8:** Parametric tests are associated with data normally distributed in a large sample size, and non-parametric tests are not normally distributed in small sample size.

**Quote/Paraphrase:** Parametric tests are those that make assumptions about the parameters of the population distribution from which the sample is drawn. There is often the assumption that the population data is normally distributed. Non-parametric tests are “distribution-free” and, as such, can be used for non-normal variables. Table 4.2 below shows the differences between parametric and non-parametric tests (FPH, 2025)**.** UK-FPH Publications.

**Essential Elements:** Parametric tests, non-parametric tests, assumptions, parameters, population distribution, population data, normally distributed, distribution-free.

**Parametric and Non-parametric Tests Table 4.2**

**(Comparing two groups)**

 

* Table 4.2. is culled from the UK-FPH: UK-Faculty of Public Health, 2025.

**Additive/Variant Analysis:** The additive is, **“**Parametric tests are those that make assumptions about the parameters of the population distribution from which the sample is drawn. The non-parametric are distribution free.” The simple description creates a simple understanding about their characteristic features. It specifies, to some extent, how each can be used in statistical tests.

**Contextualization:** Parametric and non-parametric tests are mostly utilized in population statistics. They demonstrate normal and non-normally distributed data variables. Table 4.2 above easily identifies their different areas of application.

**Source Five:**  Yang, H. (2013). The case for being automatic: introducing the automatic

linear modeling (Linear) procedure in SPSS statistics. *Multiple Linear Regression Viewpoints*, *39*(2), 27-37.

**Comment 9:** Statistical software utilization and application are on the rise for their accelerated speed, time, and cost effectiveness.

**Quote/Paraphrase:** Traditionally, linear regression modeling in the program Statistical Package for the Social Sciences (SPSS) is carried out using the Regression procedure, which is capable of fitting linear models and computing a variety of model fit statistics.- The linear procedure provides an effective, new solution to linear regression modeling in SPSS in comparison to the traditional regression procedure; where the linear procedure functions well as the latter’s substitute. That is, linear provides everything found in the traditional procedure (Yang, 2013).

**Essential Elements:** Linear regression modeling, Statistical Package for the Social Sciences (SPSS), traditional procedures, regression procedure.

**Additive/Variant Analysis:** The additive is**, “**the SPSS Linear model -provides everything found in the traditional procedure. It can fit linear models and compute a variety of model fit statistics.” These technical, statistical attributes make the SPSS a viable tool in social science. It is also utilized in psychological tests and data analysis.

**Contextualization:** The SPSS and a host of statistical software mentioned earlier are attractive to all types of organizations like public and private companies, and hospitals. Colleges of nursing and behavioral health will find the SPSS tangible as a tool for service and for experimental tests. Especially in organizations dealing with complex data and information handling and processing affiliated with Medicaid and medical data processing.

**Comment 10:** Statistics tend to fill in the gaps that mere observations and journals cannot. Instead, it provides some inductive and deductive inferences aligned to graphs, charts, and statistically formulated answers to questions asked.

**Quote/Paraphrase:** The social sciences cover diverse phenomena arising in society, the economy, and the environment, some of which are too complex to allow concrete statements; direct observations or measurements cannot define some. Statistics, being a scientific method – as distinct from a ‘science’– is used to make inductive inferences regarding various phenomena (Mukherjee et al., 2018).

**Essential Elements:** The social sciences, diverse phenomena, society, the economy, the environment, complex concrete statements, direct observations or measurements, Statistics, a scientific method, distinct, inductive inferences, and various phenomena.

**Additive/Variant Analysis:** The additive “social sciences cover diverse phenomena arising in society, the economy, and the environment, and they cannot be defined by direct observations or measurements” alone emphasizes the need for statistical applications. The applications that provide inductive and deductive inferences from multivariate and bivariate data variables. This depicts the essence of incorporating both traditional and statistical software in college curriculums.

**Contextualization:**  Modern profit and non-profit organizations have begun to apply statistical methodologies in presenting their quarterly and annual reports.

Some statistical methods may be complex to behold to some employees. Modern organizations must simplify them or introduce statistical software to process complex mathematical deductive computations. Some recommended statistical software is  “IBM SPSS Statistics for complex statistical data analysis in social sciences ($1069.2/year/user), SAS Viya for data mining, predictive modeling, and machine learning (pricing available on request). JMP for interactive data visualization and exploratory data analysis ($1320/user license). Minitab Statistical Software for quality improvement and educational purposes ($1851/year/user); QI Macros SPC Add-in for Excel for simplifying statistical process control (SPC) and quality improvement projects ($369, perpetual license); EViews for econometrics and time series analysis ($2375/user license)” (Paul, & 2025, para. 3).G2-Grid Report Publications.

**Source Six:**Kotronoulas, G., Miguel, S., Dowling, M., Fernández-Ortega, P., Colomer-Lahiguera, S., Bağçivan, G., ... & Papadopoulou, C. (2023, April). An overview of the fundamentals of data management, analysis, and interpretation in quantitative research. In *Seminars in oncology nursing* (Vol. 39, No. 2, p. 151398). WB Saunders.

**Comment 11:** In a statistical project, methods of data management involve data selection, and organization, coordination, and analysis.

**Quote/Paraphrase:**Typically, a considerable amount of numerical research data is collected that requires analysis. On entry into a data set, data must be carefully checked for errors and missing values, and then variables must be defined and coded as part of data management. Quantitative data analysis involves the use of statistics. Descriptive statistics help summarize the variables in a data set to show what is typical for a sample. Measures of central tendency (ie, mean, median, mode), measures of spread (standard deviation), and parameter estimation measures (confidence intervals) may be calculated. Inferential statistics aid in testing hypotheses about whether a hypothesized effect, relationship, or difference is true. Inferential statistical tests produce a value for probability, P value. (“An Overview of the Fundamentals of Data Management, Analysis, and ...”) (Kotronoulas, et al., 2023).

**Essential Elements:**  Numerical research data, data set, data variables, coded, data management. Quantitative data analysis, Descriptive statistics, Measures of central tendency (i.e., mean, median, mode), measures of spread (standard deviation), and parameter estimation measures (confidence intervals) Inferential statistics aid, testing hypotheses, hypothesized effect, relationship, Inferential statistical tests, value for probability, the P value, a measure of magnitude (effect size), key information for clinical decision-making.

**Additive/Variant Analysis:**The additive is, “a considerable amount of numerical research data is collected that requires analysis-carefully checked for errors and missing values, and then variables must be defined and coded as part of data management.” This portrays some of the fundamentals of data management. Interesting, is “the variables must be defined and coded.” This provides a clean set of data (to prevent errors) and is ready for qualitative or quantitative applications.

**Contextualization:**  Data management requires well-articulated planning, process, and analytical application. Some basic practicable skills are required to master the concepts and the contextualized details from A to Z. Furthermore, it is time and cost effective, and a supplementary function to conduct data management with statistical software like SAS, MTLAB, SPSS, Stat, JMP, Minitab, etc.

**Comment 12:** Statistical analysis is a viable tool in data processing and management systems.

**Quote/Paraphrase:** Statistical analysis is the process of collecting and analyzing data to discern patterns and trends. The 6 types of statistical analysis are i) Descriptive Analysis: involves collecting, interpreting, analyzing, and summarizing data to present them in the form of charts, graphs, and tables. ii) Inferential Analysis studies the relationship between different variables or makes predictions for the whole population. iii) Predictive Analysis analyzes data to derive past trends and predict future events based on data mining, data modelling, and artificial intelligence. iv) Prescriptive Analysis prescribes the best course of action based on the results. v) Exploratory Data Analysis analyzes the potential relationships within the data. vi) Causal Analysis focuses on determining the cause-and-effect relationship between different variables within the raw data (Kumar, 2024).

**Essential Elements:** Statistical analysis, collecting and analyzing data, Descriptive Analysis, Inferential Analysis, Predictive Analysis, Prescriptive Analysis, Exploratory Data Analysis, Causal Analysis.

**Additive/Variant Analysis:** The additive is, “Predictive Analysis analyzes data to derive past trends and predict future events. Prescriptive Analysis prescribes the best course of action based on the results. Exploratory Data Analysis analyzes the potential relationships within the data. The predictive, prescriptive and the exploratory data analysis tend to sum up some of the vital aspects of data management systems because they yield credible and validated statistical results. They also represent some methodological factors through which statistical data can be effectively analyzed when they are adequately put in place and utilized.

**Contextualization:**  The prescriptive, predictive, exploratory and the causal analysis must be skillfully designed and applied to analyze, and streamline the complex data sometimes, into useable, applicable simple data and information. Any processed data and information must be easily understood and comprehensible by all parties, especially the third-party stakeholders. This constitutes the basic objective and goals for effective data and information management.

**Conclusion**

Identifying the differences between a targeted population (the whole groups) and a population sample (subgroups) reveals their statistical data characteristic features. Moreover, this study shows that, using probability sampling methods (such as simple random sampling or [stratified sampling](https://www.scribbr.com/methodology/stratified-sampling/)) reduces the risk of sampling bias and enhances both [internal](https://www.scribbr.com/methodology/internal-validity/) testing (Bhandari, 2020, 2024), to enhance the sampling validity. This study touched on the parametric and non-parametric tests which are mostly utilized in population statistics. They demonstrate normal and non-normally distributed data variables. Study shows that there is an increasing rise of statistical software utilization and application. They are on the rise for their accelerated speed, time, and cost effectiveness. The linear procedure provides an effective, new solution to linear regression modeling in SPSS in comparison to the traditional regression procedure, where the linear procedure functions well as the latter’s substitute. That is, linear provides everything found in the traditional procedure (Yang, 2013). This discovery is epic and phenomenal. The SPSS and a host of statistical software mentioned earlier are attractive to all types of organizations like public and private companies, and hospitals. Statistical software does not only fill in the gaps that mere observations and journals cannot. Instead, they provide some inductive and deductive inferences aligned to graphs, charts, and statistically formulated assumptions, questions, and answers most times at the speed of light. Meanwhile, in the process of study research, methods of data management are evolving in modern organizations, and characterized by data selection, and organization, coordination, and analysis.Typically, a considerable amount of numerical research data is collected that requires analysis. Lending some credence to this is Kotronoulas, et al. (2023), Data must be carefully checked for errors and missing values, and then variables must be defined and coded as part of data management. The academia may be threading the hybrid concepts softly, but business and corporate organizations are fast embracing the practicable skill sets in data management and the statistical software that comes with them. They see this statistical software likeSAS, MTLAB, SPSS, Stat, JMP, Minitab, etc., as very time, and cost effective in complex services and operations in auto, space and aeronautical engineering, healthcare, Medicaid, and human services. They are seen as the most dependable in complex statistical situations.

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