

Social Work Research Supplement:
Notes and Worksheets for Research Methods
2nd Edition
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1. Introduction to the Research Methods Supplement (2nd Edition)

Welcome!

Welcome to the research sequence in our School of Social Work at San José State University. I hope your education here will be stimulating and rewarding. I applaud your commitment to our worthy profession. You are in a unique position to improve lives, shape communities, and better society. Although social work is often challenging and underappreciated, I trust you will find fulfillment and satisfaction through serving in the field of social welfare.

Why Supplementary Worksheets and Notes?

I have yet to find the “perfect” research textbook, although Rubin and Babbie’s *Research Methods for Social Work* is one of the best. From teaching research and understanding more about textbooks, I became convicted to have our School of Social Work try creating customized textbooks, something relatively new. I wrote the pilot version of this addendum to the research textbook in 2005, and this is the 2nd edition of the *Social Work Research Supplement*. Here are key benefits to using this version of Rubin and Babbie with the supplement:

- **Reduced Textbook Cost.** Textbooks are expensive. To help students save some money, Thomson Publishing has agreed to print and offer the same contents of your assigned research textbook in a paperback version at a price lower than new editions and most used copies.
- **Bonus Material.** This customized textbook also has the *Social Work Research Supplement*. Compared to the pilot edition, this 2nd edition adds information about qualitative research, statistical analysis, and common SPSS procedures. Although some may find research intimidating, dry, or complicated, I hope these notes and worksheets will assist your learning. This addendum **IS NOT** a replacement for information presented by your professors, for regular class assignments, or for assigned readings. It is intended to provide students with additional information and exercises to apply key research concepts.
- **Royalties?** Yes, a small royalty is earned for writing this supplement. However, for the pilot and this 2nd edition, all royalties will be donated to help our School of Social Work and its students.

Feedback Please

Using the supplement is optional, and it is definitely still a work in progress. Please follow your professor's instructions, guidance, and preferences.

Also, I would appreciate feedback and suggestions. Your input will help the School of Social Work and me decide if this supplement is useful as part of the research curriculum, and will guide my writing of future material. I would love to have a chat with you. Please come by or send comments to me via email at plee4@email.sjsu.edu.

Acknowledgements

I would like to thank Nicole Morinon and Kas Salazar at Thomson Publishing for their support of this supplement's 2nd edition. Also, thank you to our faculty and staff who have contributed their ideas to this effort. And, thanks to all you students for trying this material and for making a commitment to our noble profession of social work. Best wishes!

Peter Allen Lee
August 2007

2. Wise Consumers of Research

“That *\$@%! Required Course” or “What an Interesting Class!”

Reactions of many social work students to their enrollment in a research course may range from feelings of resentment because such courses are required (“I came here to learn practice skills, not research!”) to those of anticipation and interest (“I like research and I want to learn all about it!”). As social workers, it might help to process our thoughts and feelings:

- **What is your opinion of research?** Ask your classmates about their thoughts on research and how it might fit into their role as a professional social worker. Ask your professors, agency supervisors, and colleagues too, especially the ones involved in practice and policy.

At Least Be Wise Consumers

Learning research is part of CSWE standards and our NASW Code of Ethics. Regardless of your opinion of it, at minimum, please be wise consumers of research. Although you may never conduct another formal research project after you graduate, learn how to think critically about the practices, theories, and policies associated with the profession of social work and the field of social welfare. Why? Here are some thought questions for you:

- **How will you justify funding?** Will you need grants or donations for your program or agency? How would you convince your sponsors that your efforts are worth their money?
- **How will you determine if your practice is effective?** Most of you will be in direct practice with clients; what interventions, programs, or policy decisions are you involved with currently? How important is it for you to know if your efforts are helpful or harmful? How would you determine if your efforts are successful?
- **How will you determine if other practices or professionals are effective?** How much will you rely on the social work knowledge base (including information in professional books and journals) to improve your practice skills? What research reports, studies, or articles have you read recently? How would you evaluate whether these results, interpretations, and recommendations are trustworthy, reliable, and valid?

3. Follow Your Passion - Selecting a Research Topic

“Research” Does Not Have To Be a Curse Word

Some enjoy research. Some do not. Our attitudes can be something of a choice. Research can be interesting and worthwhile (no snickers please). Certainly, research on mainstream social work topics is valuable. Without information about poverty, violence and abuse, child welfare, gerontology, education, health, and mental health, our profession would not be able to function effectively. However, research, and especially student projects designed to learn basic concepts, do not always have to be confined by traditional issues and problems. **We can use our talents, creativity, and ideas to make research a more exciting and constructive undertaking.**

What? *That* Can be Research? – A Personal Story of Passion

I once chose to write a research paper with a certain professor because of her expertise and reputation. Eager to impress, I carefully decided upon my topic and included trendy terms to reflect both my interest in social work with ethnic groups and my basic knowledge of family mental health issues. My project was titled *Adolescent Self-Esteem and Parent-Child Relationships in Ethnic Minority Families*, which I thought would be a success because I “correctly” selected a population and issue relevant to our profession.

I met the professor, explained my topic, and left feeling assured that we would work well together. She gave me a month to write my draft, and I promptly submitted a thorough review of the literature and the latest references. I was nervous about the follow-up meeting, but found some comfort in my picking the right topic. Or so I thought.

I arrived at her office to find my paper neatly placed at the far corner of her desk. She politely asked how I was doing and then proceeded to inquire about my project. “So, how much time did you spend writing this draft?” I thought, “Oh ____!” “If I replied that I worked very hard, but the paper evaluated as poor, I was sunk. If I said that I could have worked harder, I could be criticized for not putting forth my best effort. I strategically answered, while shrinking in my chair, “Uhhhh, I think I tried to write a good proposal.” She answered, “It’s an ok paper” [whew!] “But it lacked passion.” [Ugggh!]

She then asked, “So, tell me about what else you do.” I began to panic and thought “What!!! Is this a trick question? I knew I should have tried being a baker instead!” I wondered if my academic career was in jeopardy, but I attempted to uphold some integrity by answering truthfully. I shared about my involvement in community sports programs and love of coaching. I talked about building mentor relationships with youth through common interests of basketball, volleyball, and softball. And, that our programs provide opportunities to talk with youth groups while baking cookies together at the recreation center.

Then came advice that shaped my outlook on research, social work, and life. She said, **“If that reflects your passion, why not incorporate these interests into your research and efforts as a professional?”** I was dumbfounded. I can do that? How could sports and cookies fit into a research paper? From her wisdom eventually came a research proposal: *Organized Sports Programs as an Intervention to Improve Self-Esteem in Chinese American Youth*.

Follow Your Passion and Use It to Fuel the Profession

You are a social worker because of your passion. Similarly, you can propose and conduct research guided by your passion, as long as you can justify its relevance to social work. When you do this, you may find research interesting and worthwhile, and at the same time contribute novel ideas to advance the profession.

What is Your Passion?

Brainstorm about your passion and areas of interest. Think about topics related to mainstream social work as well as those you might not initially consider relevant to the profession. Use the worksheet below to guide your thoughts:

Passion and Areas of Interest	How Can This Interest Be Incorporated Into Social Work Research and Practice?
A.	
B.	
C.	
D.	

4. Research and Scientific Inquiry

Research and Scientific Inquiry – It's All Around Us and Love Is in the Air

Whether we realize it or not, we conduct some form of research or scientific inquiry in everyday life. “What should I eat today?” “What kind of car should I buy?” “Which teacher should I try to get for my class?” These are some questions we ask, and the way we search for answers is a form of methodological research. Let’s consider a very common question:

- **Who will make a good romantic partner? (Hey! This is just for fun ok?!)**

When we think about a potential romantic partner, we might go through some basic steps:

Basic Steps	Your Inquiry Process	Equivalent Research Terminology
(1) Clarifying the focus of our inquiry		
(2) Identifying an underlying understanding to our point of view		
(3) Investigating what is known already		
(4) Anticipating an answer or making an educated guess about what to expect		
(5) Collecting information to find an answer or evaluate if our educated guess is correct		
(6) Coming to a conclusion		

Your inquiry process regarding a potential romantic partner might look like this,
(But please do NOT try this particular experiment in real life!):

Basic Steps	Your Inquiry Process	Equivalent Research Terminology
(1) Clarifying the focus of our inquiry	“I will find out who will make a good romantic partner.”	
(2) Identifying an underlying understanding to our point of view	“I will consider the notion of ‘opposites attract’ as a guide.”	
(3) Investigating what is known already	“I’ll read <i>Cosmo</i> , and <i>Men are from Mars, Women are from Venus</i> , and whatever else I can find as information.”	
(4) Anticipating a question and answer or making an educated guess about what to expect	“I wonder, are opposites attracted to each other? I’ll expect, from what I’ve found out so far, that opposites are attracted to one another.”	
(5) Collecting information to find an answer or evaluate if our educated guess is correct	“Hi Chris, this is Pat. Thanks for going out with me. I hope you didn’t mind the tape recorder and note pad at dinner. What? No, it’s not you, I’ve been taking notes on the last 50 dates because I’m trying to find out if opposites attract. Thanks also for being such a good sport in filling out my survey before dessert!”	
(6) Coming to a conclusion	“After compiling and reading what is already known, guided by the notion of ‘opposites attract’, and from my own information collected, my conclusion is that a good romantic partner will be...”	

We can attribute research terminology to these steps in your inquiry process:

Basic Steps	Your Inquiry Process	Equivalent Research Terminology
(1) Clarifying the focus of our inquiry	“I will find out who will make a good romantic partner.”	Formulating a research statement, purpose statement, or problem statement
(2) Identifying an underlying understanding to our point of view	“I will consider the notion of ‘opposites attract’ as a guide.”	Relying on a theory to guide our inquiry
(3) Investigating what is known already	“I’ll read <i>Cosmo</i> , and <i>Men are from Mars</i> , <i>Women are from Venus</i> , and whatever else I can find as information.”	Compiling and writing a literature review to provide a synthesis and argument about what is in the knowledge base
(4) Anticipating a question and answer or making an educated guess about what to expect	“I wonder if opposites are attracted to each other? I’ll expect, from what I’ve found out so far, that opposites are attracted to one another.”	Posing a research question to answer qualitatively and/or a research hypothesis to test quantitatively
(5) Collecting information to find an answer or evaluate if our educated guess is correct	“Hi Chris, this is Pat. Thanks for going out with me. I hope you didn’t mind the tape recorder and note pad at dinner. What? No, it’s not you, I’ve been taking notes on the last 50 dates because I’m trying to find out if opposites attract. Thanks also for being such a good sport in filling out my survey before dessert!”	Devising a research method and design , recruiting a sample , and developing instruments and procedure to collect data
(6) Coming to a conclusion	“After compiling and reading what is already known, guided by the notion of ‘opposites attract’, and from my own information collected, my conclusion is that a good romantic partner will be...”	Analyzing data , reporting your results , and providing a discussion interpreting your findings to reach an answer to your research question and/or a conclusion to your hypothesis

**Research and Scientific Inquiry –
Introducing a Social Work Example of Self-Esteem in Ethnic Minority Adolescents**

Let’s apply these basic steps and terms to an example closer to social work. Let’s say we are interested in evaluating the effectiveness of a self-esteem program (Project X) for ethnic minority youth. Although some of the specific terminology may not be covered until later in our course, this example will provide a preview to the process of formal inquiry you will employ:

Basic Steps	Equivalent Research Terminology	Self Esteem Example
(1) Clarifying the focus of our inquiry	Research Statement, Purpose Statement, or Problem Statement	This research examines the effectiveness of Project X in improving the self-esteem of ethnic minority adolescents.
(2) Identifying an underlying understanding to our point of view	Theory	Erikson’s stages of human development, including the concept of identity formation, will be the theory used to guide this investigation of self-esteem in ethnic minority adolescents and effective, culturally competent interventions.
(3) Investigating what is known already	Literature Review based on the Knowledge Base	Relevant, peer reviewed studies will be reviewed to provide a synthesis of the knowledge base pertaining to self-esteem in ethnic minority adolescents and the potential effectiveness of Project X in improving their self-esteem.
(4) Anticipating a question and answer or making an educated guess about what to expect	Research Question and/or Research Hypothesis	How effective is Project X in improving the self-esteem of ethnic minority adolescents, and if effective, why does it work? It is hypothesized that ethnic minority adolescents who participate in Project X will have higher self-esteem than their peers who do not participate in the project.

Basic Steps	Equivalent Research Terminology	Self Esteem Example
5) Collecting information to evaluate if our educated guess is correct	Research Method and Design Sample, Instruments, and Procedure for Data Collection	In this research, quantitative and qualitative methods will be used. (Specific research designs will be discussed in class.) (Specifics regarding sampling methods, operational definitions, themes, designing instruments, and procedures for data collection will be discussed in class.)
(6) Coming to a conclusion	Results and Discussion	(Specifics about how to report and interpret results will be discussed in class.)

**Research and Scientific Inquiry –
Your Turn**

Now, let's apply these basic steps and terms to your topic. First, list some of your potential topics:

Then, pick one of your potential topics, hopefully one you are passionate about, and try filling in the second column of the worksheet below:

Equivalent Research Terminology	Your Topic
(1) Research Statement, Purpose Statement, or Problem Statement	Complete the sentence, "This research examines..."
(2) Theory	What theory will you employ?
(3) Literature Review based on the Knowledge Base	What are some scholarly books, journals, articles, and other sources you can include for your review?

5. Quantitative Versus Qualitative Research

A General Comparison of Two Approaches

The following grid is a GENERAL comparison of quantitative and qualitative research methods. Please consult with your professor and review your assigned readings to understand these concepts in greater detail.

Quantitative	Qualitative
<ul style="list-style-type: none"> • Both are driven by a primary research issue or problem • Both follow similar, logical steps in the research process • To some degree, both rely on theory, existing literature, and standards in procedure • Both can employ multiple methods of data collection (i.e., triangulation) • They are not mutually exclusive; studies can employ both quantitative and qualitative methods in a research design to better address a problem or issue 	
<ul style="list-style-type: none"> • Type of questions formulated are usually predetermined 	<ul style="list-style-type: none"> • Type of question formulated usually “what’s going on here?” “how does that happen?” • additional questions arise from process
<ul style="list-style-type: none"> • Primarily uses deduction (using theory to make predictions about a specific situation) 	<ul style="list-style-type: none"> • Analysis of data inductively, attention to particulars and details
<ul style="list-style-type: none"> • Often involves hypothesis testing 	<ul style="list-style-type: none"> • Seldom interested in hypothesis testing
<ul style="list-style-type: none"> • Usually not in a natural setting (survey site, program location, clinic, lab, classroom) 	<ul style="list-style-type: none"> • Natural setting (field focused) as source of data
<ul style="list-style-type: none"> • Researcher is detached; usually study is more “objective” and value-free in terms of being less influenced by bias 	<ul style="list-style-type: none"> • Researcher is involved; usually study is more “subjective” with the participants’ values present and explicit
<ul style="list-style-type: none"> • Inquiry process of understanding based on precise, objective, and generalizable findings 	<ul style="list-style-type: none"> • Inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting
<ul style="list-style-type: none"> • Focus on variables 	<ul style="list-style-type: none"> • Focus on interactive processes, events
<ul style="list-style-type: none"> • Usually few variables, many cases 	<ul style="list-style-type: none"> • Usually few cases, many variables
<ul style="list-style-type: none"> • Predetermined clear operational definitions 	<ul style="list-style-type: none"> • Concepts and definitions often clarified as data collected

Quantitative	Qualitative
<ul style="list-style-type: none"> • Emphasis on objective measurement of participants' characteristics and scores on specific factors • Interested in comparisons, relationships, cause and effect, association between variables 	<ul style="list-style-type: none"> • Seeks the participants' perspectives and their meanings (including social reality and cultural meaning) • Researcher's role as learner not expert or specialist • No intervention, no control group, no experimental design, no manipulation of variables
<ul style="list-style-type: none"> • Measurement scales, surveys, and quantifiable sources as key instruments of data collection 	<ul style="list-style-type: none"> • Researcher as key instrument of data collection (participant-observation)
<ul style="list-style-type: none"> • Data is distinctly measured and quantified 	<ul style="list-style-type: none"> • Data primarily words from open ended questions, interviews, observations, documents and images/information from audio-visual materials
<ul style="list-style-type: none"> • Independent of context 	<ul style="list-style-type: none"> • Situationally constrained
<ul style="list-style-type: none"> • Reliability and validity are key 	<ul style="list-style-type: none"> • Authenticity, credibility, and verification are key
<ul style="list-style-type: none"> • Statistical analysis 	<ul style="list-style-type: none"> • Thematic analysis
<ul style="list-style-type: none"> • Outcome as product 	<ul style="list-style-type: none"> • Outcome as process
<ul style="list-style-type: none"> • Persuasion by tests of significance 	<ul style="list-style-type: none"> • Persuasion by reason
<ul style="list-style-type: none"> • Report driven by use of empirical data 	<ul style="list-style-type: none"> • Report uses expressive language and journalistic narrative with rich detail

**Use the Right Tool for the Right Job –
When to Use Quantitative and Qualitative Research**

Students often choose a topic or method according to their level of familiarity or comfort with certain research procedures. For instance, some might avoid quantitative research because of math phobia, and others avoid qualitative research because it is relatively abstract and is assumed to be more work.

I highly recommended choosing your research method AFTER you have determined your topic. The expression about using the right tool for the right job applies to research in that it is fruitless to force a procedure onto an investigation if it cannot yield useful information.

Why Qualitative Research?

Qualitative procedures are more appropriate for some topics. For example, how would you investigate the concept of love? Although a Shakespearian romantic might say “Oh how I love thee, let me count the ways” you would not express to your fiancé “I love you 9.3 on a scale of 10.” Qualitative inquiry would lead to in-depth answers and a better understanding of who,

what, when, where, why, and/or how. For instance, from a series of interviews you could obtain information on what is love, how love is expressed, and why people love. You might have a topic that cannot be examined quantitatively, and thus you should employ qualitative methods.

Why Quantitative Research?

Quantitative procedures are more appropriate for other topics. If you need to test empirically the relationship between certain factors, you would rely on numerical analysis. For example, to examine client satisfaction and provide a concise summary to the agency, qualitative information may not be as appropriate, especially if you attempt to include detailed, narrative information. However, data gathered from surveys designed to measure demographic characteristics and client satisfaction could be analyzed to provide a basic statistical description of your clientele and determine the strength of the relationships among those variables. You might have a topic that cannot be examined qualitatively, and thus you should employ quantitative methods.

Triangulation – Using Both Quantitative and Qualitative Methods

Triangulation, basically using two or more ways to examine the same concept, will strengthen the research process and provide more information to address your topic. For example, to study the life satisfaction of social work students, a quantitative survey to collect demographic information and measurements of psychosocial well-being, and also a qualitative interview to capture better the flavor of student experiences and circumstances could be used in combination. Because triangulated, quantitative and qualitative projects are resource and labor intensive, they are more difficult to design and implement, but they are also usually more valuable than those only using one approach. At least consider how quantitative and qualitative elements could be used in your research, and if possible, use both methods.

Try not to discard a quantitative or qualitative method altogether due to feasibility concerns or lack of experience and expertise in a particular method. Consider that one design can serve as the primary method (e.g., cross-sectional survey research or a case study via interviews with a relatively large sample) and a secondary method included for the sake of some triangulation (e.g., survey research with a simple questionnaire to measure demographics and basic levels of a characteristic or phenomena, or a small set of interviews with key informants, experts, or primary stakeholders). You will see that including even a modest amount of triangulation produces significant benefits in improving the breadth and depth of a study.

A Note About Exploratory, Descriptive, and Explanatory Research

In general, there are three purposes of research: exploration, description, and explanation. The purpose of **exploratory research** is usually to investigate new topics or areas of study without much existing evidence, usually with methods including a relatively small sample or questions

that will lead to the design of a follow-up or more elaborate study. **Descriptive research** is used to provide an overview of a topic often with summary information and statistics in order to provide the “big picture.” **Explanatory research** is used to provide the reasons “why” something occurs, particularly providing evidence as to the link among the study factors and illustrations as to how aspects within research interest function together. Although in general the sophistication of research aims and methods range from exploratory being the most simple to explanatory being the most complicated, any particular study can have more than one purpose and vary in complexity. Also note that quantitative and qualitative methods can be employed in all three of these types of research: explanatory, descriptive, and explanatory.

Aim of the Social Work Research Sequence: Explanatory Research

All three research purposes (exploration, description, and explanation) and their respective designs are legitimate for social work inquiry. **However, our goal in the social work research sequence is to emphasize explanatory research and techniques that will help students understand social work practice in the context of applied research.** Here are the reasons why we promote this:

- First, a majority of the social work professional knowledge base and the publications within it contain explanatory research studies. Students must understand how relationships among variables, factors, and themes are conceptualized, analyzed, and interpreted in order to be critical thinkers and wise consumers of this information that will help hone their practice skills.
- Second, studying all three levels of research (exploratory, descriptive, and explanatory) provides an outline and guide to understand better the various levels of statistical and thematic analysis associated with quantitative and qualitative research methods. For example, using bivariate and multivariate statistical tests, as well as in-depth procedures for qualitative analysis and interpretation will provide a much richer and more thorough explanation and evaluation of a topic than providing univariate statistics such as frequencies, percentages, central tendencies, and simple quotes.
- Third, in order to understand your topic or issue of interest in an environmental and systems context as close to the “real world” as possible, analyzing multiple factors and variables simultaneously is often a must. This will entail multivariate analysis and more in-depth interpretation of qualitative information. This point will be reiterated in the next chapter about building your research model.

What Approach Will You Use?

Refer to your list of potential areas of interest and research topics. Consider how you would examine these topics quantitatively and qualitatively. Also, for each study indicate its potential purpose (exploration, description, explanation), and if NOT primarily explanatory, challenge yourself by indicating how you could include an explanatory, methodological component. Use the worksheet below to guide your thoughts:

Areas of Interest – Potential Topics and Purpose (Exploratory, Descriptive, or Explanatory)	Quantitative Approach	Qualitative Approach
A.		
B.		
C.		
D.		

6. Building a Model – Thinking of Variables and the Relationships Among Them

In the context of research, building a model involves diagramming your topic, the factors involved, and their possible relationships. Drawing your model will help you visualize ideas and clarify concepts about your problem or issue of interest.

An Example of Social Work Student Life Satisfaction

To start our model building process, we will draft a **research statement**:

- “**This research examines the predictors of life satisfaction in social work students.**”

Next, we will draw a circle to represent the focus of our issue. We can consider this the world of social work student life satisfaction.

- The **population** is social work students.
- The **dependent variable**, an outcome or that factor being affected, is life satisfaction.

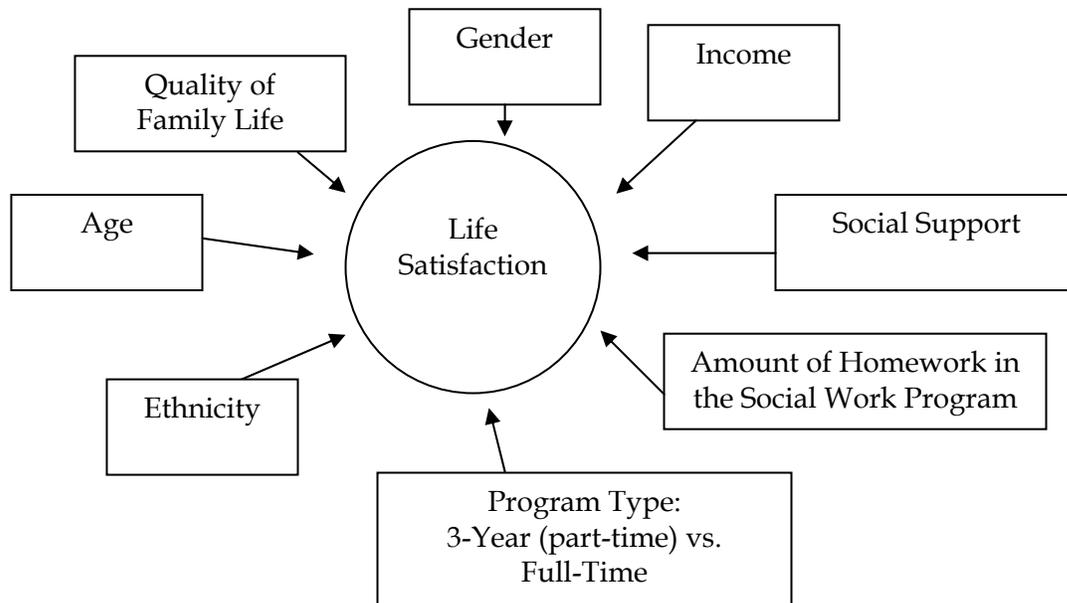


Then, brainstorm about what factors affect social work student life satisfaction. These are your potential independent variables.

- **Independent variables** are those factors that potentially affect an outcome or the dependent variable.

Compile your own list of independent variables affecting life satisfaction of social work students below:

Anticipating some of the factors on your list, let's add some independent variables to our model. We can also draw arrows to represent potential relationships between variables:

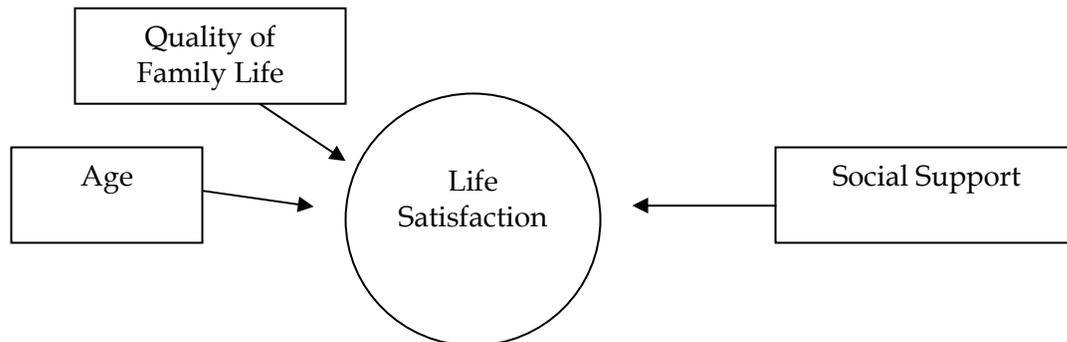


Caution! Our Model Versus the Real World

In the real world, there can be literally thousands of factors influencing life satisfaction. Also, the unidirectional arrows you see in the model above only reflect the possible relationships from our potential independent variables to our dependent variable. In the real world, relationships can be bidirectional and arrows can connect each and every variable to one another. But to try and diagram everything in the real world would be unrealistic and would make our research unwieldy. So, we do the best we can to select key factors, based on a thorough literature review, feasibility, and our passion, to create a manageable model of an investigation useful in informing and advancing the profession.

Managing Your Model - It's a Big World Out There!

Let's assume we cannot always have the whole world in our hands. So, based on a literature review, feasibility, and our passion, we decide on three independent variables:



We can now revise our research statement to reflect our new focus:

- **“This research examines age, quality of family life, and social support as predictors of life satisfaction in social work students.”**

Qualitative Models

The above example might reflect a model seemingly appropriate for quantitative inquiry. However, hopefully you will see that diagramming your ideas will help you conceptualize your research topic even if you do not have specific independent and dependent variables. In a qualitative sense, you will still have themes or factors of interest.

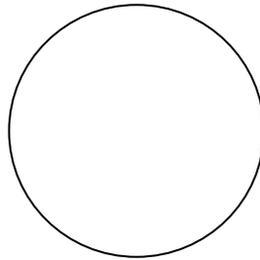
Can't I Have a Bigger World?

Your professors may initially recommend relatively simple models so that students can focus on learning basic research concepts, methods, and data analysis at an appropriate level. However, as your research interests and skills become more sophisticated, you will discover that there are ways to build, study, and analyze larger models that resemble something closer to what you encounter in the real world.

Building Your Model

Your turn! Select a topic, identify the key components of your project, and diagram your model:

- Problem/Issue:
- Research Statement: “This research examines...”
- Population:
- Dependent Variable(s):
- Independent Variable(s):



What if I Don't Have Independent and Dependent Variables? Another Comment on Exploratory, Descriptive, and Explanatory Research

If you cannot identify clearly the independent and dependent variables in your model, it is possible that your research is only exploratory or descriptive in nature. For example, if you are interested in the prevalence of child abuse or assessing the well-being of an ethnic inner-city community, you might only have summary statistics and information. Without sacrificing your topic, you could add factors or variables that are hypothesized or assumed to be related to the condition or issue of interest in order to add depth to your study and understanding. For example, what are some of the demographic or systemic characteristics that are related to child abuse, or how does well-being in that inner-city community vary by ethnic group, age, socioeconomic status, or level of support service utilization? Deepening your critical thinking and analysis of a topic can transform an exploratory or descriptive study into a more explanatory one.

Do I Have To Design An Explanatory Study?

Ask your professor. If it were up to me, yes you would need to design an explanatory study!

Remember, the point is not to make students suffer through complicated research methods. Rather, in order to stimulate appreciation of applied research and to broaden your understanding of the field of social welfare and information useful for your practice, exposure and training in all three levels of research (exploration, description, and especially explanation) are vital.

7. Examining Research Topics and Terms

Let's apply your knowledge of some basic research concepts and terminology. In the following fictitious research scenarios, identify the general **problem/issue**, the **research statement**, the **dependent and independent variables**, **hypothesis(es)**, **research question(s)**, **operational definition(s)**, and **theme(s)**:

- A. Social workers in a variety of professional settings have been called upon to respond to cancer and cancer related issues, one of the most pressing public health problems confronting today's society. Yet there is limited research examining how social work students are being prepared to address these issues. This study will examine the differences in knowledge and attitudes regarding cancer and cancer related issues in 100 social work students: 50 first-year and 50 final-year students. It is hypothesized that both knowledge and attitudes about cancer and cancer related issues (scores measured by the Whatsit Scale) will vary by year in the graduate program. The anticipated findings will illustrate the need for incorporating cancer education in the social work curriculum.

Problem/Issue:

Research Statement:

Dependent Variable(s):

Independent Variable(s):

Hypothesis(es):

- What research question(s) could one ask if a qualitative component were added to this study? What themes might be found?
- Operationalize one of the variables above:

- B. The number of pregnant and parenting teenagers is growing in our country. This study will examine attitudes about sexual activity as a predictor to teenage pregnancy while controlling for socioeconomic status (SES), grade point average (GPA), and ethnicity. 200 female students will be sampled from high schools in the metropolitan area and will complete the OHGEE Instrument of Sexual Attitudes as well as a demographics questionnaire assessing pregnancy (pregnant vs. non-pregnant), SES (low, medium, or high), GPA, and ethnicity (White, Black, Latina, or Asian). It is hypothesized that a more promiscuous sexual attitude would be related to a teenager being pregnant. It is also hypothesized that pregnancy condition would vary by SES, GPA, and ethnicity. These results will suggest strategies for teenage pregnancy prevention and support for adolescent mothers.

Problem/Issue:

Research Statement:

Dependent Variable(s):

Independent Variable(s):

Hypothesis(es):

- What research question(s) could one ask if a qualitative component were added to this study? What themes might be found?
- Operationalize one of the variables above:

Another Scenario

- C. John and Jane decide to use quantitative and qualitative methods in order to establish triangulation in their study of the parent-child relationship and stress in ethnic minority families living in metropolitan areas. Specifically, they examine the number of years spent living in the United States, the length of time parents spend together with their children, and socioeconomic status as predictors of both the overall quality of the parent-child relationship and the stress level of these families. From this information:
1. Write a complete and concise research statement describing John and Jane's study:
 2. IDENTIFY the dependent variable(s):
 3. IDENTIFY the independent variable(s):
 4. From your answers in 2 and 3 above, pick one independent variable and one dependent variable and write a NON-DIRECTIONAL hypothesis. Then, using the same variables, write a DIRECTIONAL hypothesis.
 5. Write one possible open-ended qualitative research question Jane and John could ask that compliments the quantitative portion of their investigation:

8. Evaluating Ethics in Research

Review the readings and terminology concerning research ethics. In the following fictitious scenarios, please:

- A. Identify at least 3 potential ethical issues;
- B. Describe why they are of concern; and
- C. Offer a possible solution to each issue

Scenario A

A new medication has been developed to reduce the addiction symptoms of heroin users. Pilot studies indicate that the medicine will reduce substance users' addiction to heroin (measured by a standardized addiction scale), but no documented empirical evidence exists. The medicine is very expensive, but Dr. Ghotatryit has been given a \$1,000,000 grant to conduct a study. He decides to include 100 participants in his sample. Participants are recruited from a variety of inner-city drop-in substance use clinics with clients from low-income and ethnically diverse backgrounds. They are informed that they will be part of a study to test the effectiveness of a new medicine intended to reduce heroin addiction, but that what they receive may be the actual medication or only a placebo. Within a few days 100 clients agree to participate and sign a consent form. Half are given the medicine and half are given a placebo. After Dr. Ghotatryit collects and analyzes the data about the medicine's effectiveness, he finds that there is a significant positive effect in reducing addiction symptoms in the medicinal group compared to the placebo group. He thanks the participants publicly at a neighborhood party to celebrate the project and acknowledges the clinics involved. He then proceeds to publish his findings. In his article, he includes the names of the participants so that future researchers can confirm the positive influence the new medicine has had on participants' lives as recovering substance users.

Scenario B

John and Jane are studying the parent-child relationship and stress in ethnic families living in metropolitan areas. They visit a local park often used by families. They approach prospective participants, one family at a time, and ask the parents to complete a survey. While John is assisting the parents with the survey, Jane keeps the children occupied by asking them the question, "So what do you think of mommy and daddy?" Also, in order to maximize their sample size, they say to each family, "We would like your help in completing our survey. Consider participating in our study and we will give you a gift certificate for a free meal at the local diner." They give out meal certificates to all families they approach regardless of their participation.

Are You Conducting Ethical Research?

In your project, what are some potential ethical concerns and how will you address them?

9. Sampling Scenarios

Review sampling techniques. You should have a working knowledge of specific types and methods within the two families of sampling: probability and non-probability:

Probability Sampling (utilizing scientific aspect of random selection)	Non-Probability Sampling (not utilizing scientific aspect of random selection)
Simple random sampling	Convenience sampling
Systematic sampling	Purposive sampling
Proportional stratified random sampling	Quota sampling
Disproportional stratified random sampling	Snowball sampling
Cluster sampling	

In the following scenarios:

- A. Identify a specific and suitable method of sampling;
 - B. Briefly describe how that sampling method would be implemented in the example; and
 - C. Justify its use in the situation
1. Costner and Connery wish to examine the problem of juvenile delinquency in the inner-city districts of Chicago. They decide to use qualitative research methods involving in-depth interviews of youth at risk for criminal activity. They will not have problems gaining the trust of prospective participants but have access to only a few youth qualified for their research.

 2. Cruise and Hoffman develop a project to examine the predictors of autism. They want their research project to be as generalizable and representative as possible, and have funds to include 1,000 children in their sample.

3. Gender may influence how one chooses a profession. Little is known about how attitudes regarding gender roles and stereotypes affect men and women's choices to become social workers. King and Riggs want to explore this issue and include a representative proportion of men and women similar to that found in the registry of NASW. They can afford a sample of 500.

4. Stiller and DeNiro are curious about whether the quality of spousal relationships varies among certain ethnic groups. Although they have limited resources, they do have access to a family center in a diverse metropolitan area. In their sample of 100, they want equal representation of Asian American, African American, Latino, and European American married couples.

5. Connelly and Crowe wish to examine support and coping strategies of families with a member diagnosed with schizophrenia. They want their research to be generalizable to families of schizophrenics across the nation and have funds to include 500 families in their sample.

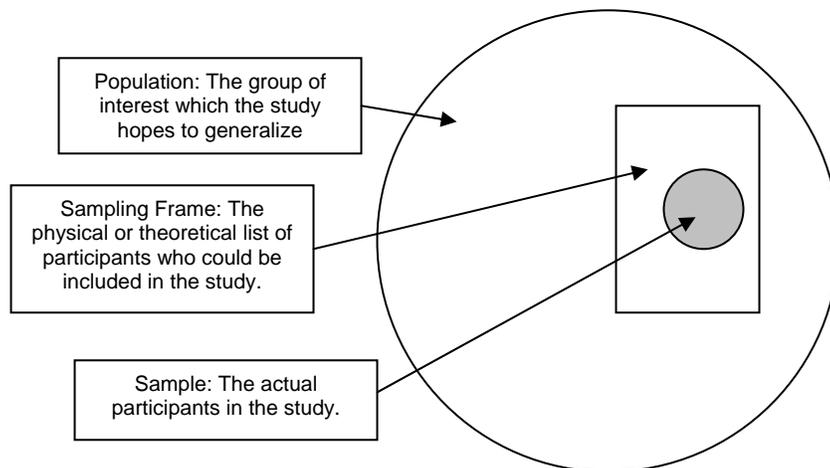
6. Moore is interested in researching the views and activities of radical, "underground", socio/political activists. He intends to use this information to inform a future, larger study on politics in America in relation to social welfare policy.

7. Ethnicity and gender are often found to be linked to salary. Fields wants to explore this issue further and she includes a representative proportion of men and women among five ethnic groups similar to that found in the national census. She can afford a sample of 5,000 adults.

8. Shatner and Nemoy, both veterans, are curious whether naval officers who are close to retirement intend to seek employment in certain professions upon discharge. They are on a low budget. They choose to visit a local naval base for help. They hope to have a sample of at least 50.

A Sampling of Sampling

In your project, what sampling method will you use? Select the appropriate sampling method for your study, and also explain below your sampling procedure including the terms **population**, **sampling frame**, and **sample**:



10. Measurement Exercise

Review measurement, specifically the definition of categorical and continuous variables, as well as nominal, ordinal, interval, and ratio levels of measurement. Remember the two general families in measurement and the two levels within each:

Categorical Variables (those which are measured as groups)	Continuous Variables (those which are measured on a scale)
Nominal (measured only in terms of a designation or name without any inherent value or order)	Interval (measured on a scale without a true zero value)
Ordinal (measured in terms of a designation or name AND with inherent value or order)	Ratio (measured on a scale with a true zero value; remember "ray-she-o" as in having an "O" for zero)

Let's assume that the following questions are asked on a survey designed by John and Jane for their project examining the parent-child relationship and stress in ethnic minority families living in metropolitan areas. Specifically, they are measuring the number of years spent living in the United States, the length of time parents spend together with their children, socioeconomic status, the overall quality of the parent-child relationship, and the stress level of these families.

1. What is your ethnicity? _____
2. How many years have you lived in the United States? _____ years
3. How many children do you have? _____ children
4. What is your family's annual income in dollars? \$ _____
5. On average, how much time do you spend with your children each day? (please check one):
 - No time
 - 1 to 30 minutes a day
 - 31 to 60 minutes a day
 - 61 to 90 minutes a day
 - More than 90 minutes a day
6. Consider your stress level on an average day. On a scale of 1 to 5 (1 being "very low" and 5 being "very high"), rate your typical stress level. (please circle one):

1	2	3	4	5
Very Low	Low	Average	High	Very High
7. On a scale of 1 to 5 (1 being "very poor" and 5 being "very good"), how would you rate the quality of the parent-child relationship in your family? (please circle one):

1	2	3	4	5
Very Poor	Poor	Average	Good	Very Good

For each variable, first identify if it is categorical or continuous, and then identify if it is nominal, ordinal, interval, or ratio:

- Ethnicity:
- Years lived in the United States:
- Number of children:
- Family's annual income:
- Time spent with children
- Stress level
- Quality of the parent-child relationship

What Will You Measure?

Refer to your model. List your variables and identify what level of measurement you expect each to be. What operational definitions, items, questions, or full instruments will you use? Remember, any variable theoretically can have multiple operational definitions depending on how it is measured in the context of a particular study. For example, age could be asked on a survey in the form of an open-ended question "what is your age?" making it continuous and ratio in measurement, or asked in the form of predefined check-off boxes with choices "under 18 years old" and "18 years and older" making it categorical and ordinal. **Identify the level of measurement according to the operational definitions you expect to use IN YOUR STUDY.** Try the worksheet below:

Variable and Level of Measurement	Operational Definition and Appropriate Item, Question, or Instrument

12. Research Design Scenarios

Review cross-sectional survey research, longitudinal research, group designs, and single subject designs. In the following research scenarios, briefly:

- A. Identify a specific SUITABLE research design, and include diagrams and symbols (if any);
 - B. Describe how that design would be implemented in the example;
 - C. Justify its use in the situation; and
 - D. Explain two potential threats to internal validity or limitations related to the design
1. Robbins and Freeman wish to examine the effectiveness of Program Redemption on reducing the recidivism of released adult convicts living in rural communities. They have almost unlimited resources and permission from the institutional review board to conduct their intervention in any way they desire.
 2. Williams wants to evaluate and measure over a series of weeks the effectiveness of a new therapy program in reducing psychiatric symptoms on his assigned group of in-patient mental health clients.
 3. Hoffman and Russo want to gather basic demographic information and quantifiable data regarding job satisfaction from a large sample of public health professionals.
 4. Fonda and Hepburn want to assess marriage satisfaction in adult couples over the next 25 years.
 5. Looking again at the four scenarios above, how would you add a qualitative method to compliment the original design you chose? What are the advantages and disadvantages of having this triangulated, mixed-methods approach?

13. Qualitative Designs

Review qualitative methods and designs. Although there are dozens of qualitative designs, it might help to identify a few of the most common qualitative approaches. Creswell (1998, 2006) identifies in his book, *Qualitative inquiry and research design: Choosing among five traditions*, five common designs:

- **Phenomenology**, where the researcher examines a common experience (e.g., studying the coping strategies of those who encounter child abuse, or the reaction of those specifically involved in an agency program).
- **Ethnography**, where the researcher examines a group and their behaviors, customs, life practices usually through extended exposure (e.g., understanding the life of social workers, or insights into the circumstances of families living in an impoverished, inner-city neighborhood).
- **Grounded theory**, where the researcher focuses on the researching, developing, and evaluating an underlying understanding and explanation (i.e., theory) to a phenomenon (e.g., understanding and explaining why battered women return to relationships involving domestic violence, or understanding and explaining how at-risk children develop resilience to difficult life circumstances).
- **Biography**, where the researcher examines an individual and his/her life experiences and circumstances (e.g., documenting the life of Mary Richmond and her influence on social work, or the life history of Sam as an example of overcoming a learning disability). Note that Creswell (2006) includes this as part of narrative research in his 2nd edition.
- **Case study**, where the researcher explores in depth a single client and the circumstances involved with that client's condition (e.g., an assessment, case plan, and outcome for Client X), or a particular event and the circumstances and effects associated with that incident (e.g., an assessment and ramifications of September 11th).

In the literature you will find that some of the above terms are used interchangeably, but hopefully the basics above will help guide your understanding of qualitative designs. Select a topic of interest and consider:

- A. Which qualitative design would be appropriate for studying your problem or issue?
- B. What procedures and forms of data collection would be involved?
- C. How would this qualitative design compliment a quantitative component to your study?

14. Verification of Qualitative Data

Similar to quantitative methods and data, qualitative designs and information must also bear scrutiny. Some terms used to refer to the reliability and validity of qualitative methods and data include rigor, trustworthiness, credibility, and verification. Creswell (1998, 2006) identifies some common procedures to verify data and increase the credibility of the study's findings:

- **Integrity in analysis:** generating and assessing rival conclusions so as to assure that information and interpretations are not erroneously fitted into preconceived themes and set ways of understanding
- **Design checks:** keeping methods and data in context of your study and its environment
- **Prolonged engagement and persistent observation:** working over an extended period of time in order to build trust with participants, learn the culture, and check for misinformation which stems from distortions introduced by the researcher or informants.
- **Triangulation:** the use of multiple and different sources, methods, investigators, and theories to provide correlating evidence.
- **Peer review or debriefing:** an external check with peers and colleagues to monitor the research process.
- **Negative case analysis:** the process of refining working hypotheses when encountering negative or disconfirming evidence. This process continues until all cases fit the reworked hypotheses.
- **Clarifying researcher bias:** the researcher's position, bias, or assumptions stated at the outset of a study which may shape his/her interpretation or approach.
- **Member checks:** solicitation of informants' views of the credibility of the findings and interpretations.
- **Rich, thick description:** the detailed accounts and information which facilitates the transferability of such data to other settings.
- **External audits:** the involvement of an outside consultant or auditor (having no connection to the study) to examine both the process and the product of the study.

Some of these verification procedures will work better when doing interviews as part of a phenomenology or in the context of observation when doing ethnographic research. Consult your texts and instructors for a more in-depth explanation and review of these concepts.

Review qualitative methods and procedures for increasing the reliability and validity of qualitative data. In the following research scenarios:

- A. Identify three specific verification strategies appropriate for the scenario
 - B. Explain each verification procedure in the context of the scenario; and
 - C. Explain how the credibility of the qualitative data would be increased.
1. Arkin is interested in family dynamics and the communication patterns within households containing three generations or more. Given his own history of disability, he is especially interested in how a family system is affected and copes when one of its members has been diagnosed with a psychological disorder. He decides to use a qualitative, phenomenological approach, and conducts both 60-minute, individual, face-to-face interviews with a total of 101 participants across 24 families, and 90-minute, face-to-face, group interviews with each of the same families.
 2. Banderas is designing a dance therapy technique for at-risk adolescents. First, in order to understand better teenagers and their lifestyle, he decides to visit 10 high schools located in urban, inner-city areas of New York state. He will be gathering qualitative data for an ethnography primarily through participant observation, possibly becoming involved as volunteer, visiting dance instructor, but is open to other means to acquire useful information.
 3. Angel Island in the San Francisco Bay, once considered the Ellis Island of the West Coast, is now a National Park containing the immigration station that housed Chinese for processing before allowed entry into the United States between 1910 and 1940. Many carvings and writings in several languages have been found on the barracks walls, including more than 135 poems written in Chinese. Historians and researchers are working to preserve, document, and study these carvings, which constitute an interesting set of archival qualitative data useful for an ethnographic case study (for information on this project, visit <http://www.kqed.org/w/pacificlink/history/angelisland/poetry/>).

15. Analyze This...

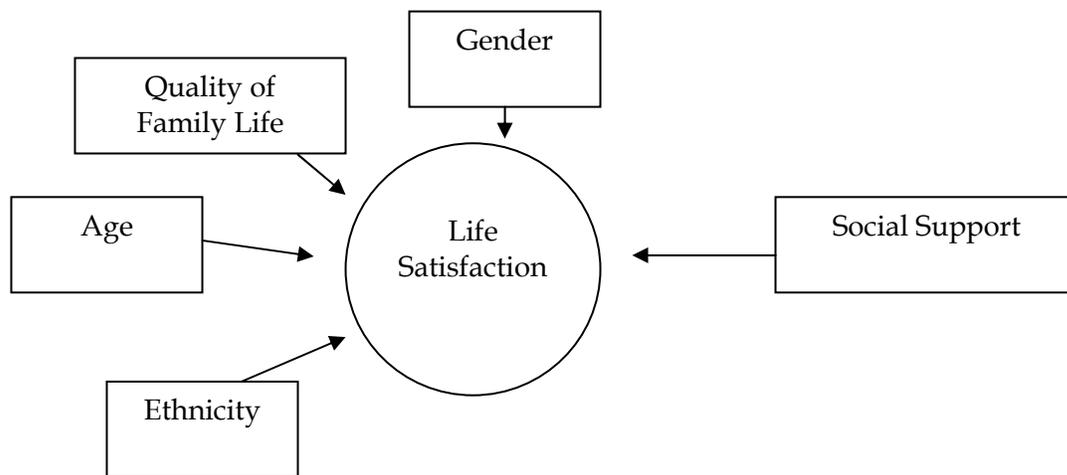
How To Choose Appropriate Statistical Tests

It can be quite a challenge to finding the correct statistical tests to analyze your data. As with anything else, learning the basic concepts and practicing them will help. Let's look at our example of life satisfaction among social work students and see how this can be translated into an outline to help identify the appropriate statistical tests.

Example: Predictors of Life Satisfaction of Social Work Students

Recall our model example from Chapter 6. I have added control variables to our example:

- **This research examines age, quality of family life, and social support as predictors of life satisfaction in social work students while controlling for gender and ethnicity.”**



In this example, there are six variables total. Age, quality of family life, and social support are the main independent variables and life satisfaction is the dependent variable. Gender and ethnicity are control variables, and they are also independent variables. Next is an outline for each level of analysis of this model: univariate, bivariate, and multivariate. Note that operational definitions specific to this example and the level of measurement for each variable are also included. And, there are listings of statistics that can be generated and the statistical test for each of analysis.

Predictors of Life Satisfaction of Social Work Students

Note that all six variables in the model are listed in the **univariate** section so that a basic analysis of each can be conducted.

Univariate / Descriptive Statistics and Tests		
Variable		Statistics and Test
Age (in years): continuous and ratio		Frequency, percentages Range, minimum and maximum Mode, median, mean, std. dev.
Quality of Family Life (measured by the Family Life Scale): continuous and ratio		Frequency, percentages Range, minimum and maximum Mode, median, mean, std. dev.
Social Support (measured by the Social Support Scale): continuous and ratio		Frequency, percentages Range, minimum and maximum Mode, median, mean, std. dev.
Gender (male, female): categorical and nominal		Frequency, percentages, mode One Variable Chi Square test χ^2 and p value (or the binomial test)
Ethnicity (White, Black, Other): categorical and nominal		Frequency, percentages, mode One Variable Chi Square test χ^2 and p value
Life Satisfaction (measured by the Life Satisfaction Inventory): continuous and ratio		Frequency, percentages Range, minimum and maximum Mode, median, mean, std. dev.
Bivariate Statistics and Tests		
Independent Variable	Dependent Variable	Statistics and Test
Age	Life Satisfaction	Pearson Correlation r and p value
Quality of Family Life	Life Satisfaction	Pearson Correlation r and p value
Social Support	Life Satisfaction	Pearson Correlation r and p value
Gender	Life Satisfaction	Means (sd) by group Independent Samples t -test t and p -value
Ethnicity	Life Satisfaction	Means (sd) by group One-Way Independent-Samples ANOVA with post-hoc test F and p value
Multivariate Tests		
Independent Variables	Dependent Variable	Statistics and Test
Age, Quality of Family Life, Social Support, Gender, and Ethnicity	Life Satisfaction	Multiple Linear Regression with dummy coding, Adj. R^2 , F , predictor p values

Note that at the **bivariate** level, each independent variable is paired for analysis with the dependent variable.

Note that at the **multivariate** level, all independent variables are included in the analysis with the dependent variable, which enables us to look at the whole model at once.

Finding the Correct Test for Each Analysis Level

Review your class materials and textbooks to find which statistical tests are used for particular situations. Below are some basic descriptions and examples of tests.

Binomial and One-Variable Chi Square

The **binomial** and **one-variable Chi square** tests are nonparametric tests used at the univariate level. They are useful in statistically examining the proportion of a single categorical variable; the **binomial test** is used only when the categorical variable has two and only two subcategories (e.g., female/male, yes/no, true/false) and the **one-variable Chi Square test** with a categorical variable with two or more subcategories (e.g., political group defined as Republican, Democrat, or Independent, or ethnicity defined as White, Latino, Asian American/Pacific Islander, African/Black American, Native American, and Other).

For example, one might be studying recidivism in juvenile justice cases and the sample of 200 cases contains 119 boys and 81 girls. How would you know if your findings can be generalized to both boys and girls since your proportion of males and females seems unequal? You would run the binomial or one-variable Chi Square test to see if the proportions are statistically comparable. If the proportion is not found to be statistically different (at $\alpha = .05$) then you can make the argument that your findings are generalizable to boys and girls.

Similarly, if your new program to improve mental health service utilization was evaluated with a sample of 100 clients, and cultural competency in regards to ethnicity was important, how would you determine if your findings were generalizable to these different groups? Thirty-five were White, 27 Latino, 10 Asian American/Pacific Islander, 8 African/Black American, 3 Native American, and 17 Other. You would run the one-variable Chi Square test to see if the proportions among these 6 study ethnic groups are equal. If the proportion is found to be statistically different (at $\alpha = .05$) with perhaps an under-representation of Asian American/Pacific Islanders, African/Black Americans, and Native Americans, then the generalizability of your findings to those groups would be limited.

t tests (t for two)

The family of *t* tests (one sample *t* test, independent samples *t* test, and dependent samples *t* test) are all parametric tests used at the bivariate level and all compare means between two groups. Hence, to help remember when to use *t* tests, think "*t* for two."

The **one sample t test** compares *two* average values: the first generated from your sample compared with a second known from another study or in the population. For

example, if you assessed self-esteem among Latino elementary school children using the Rosenberg Self-Esteem Inventory, you could compare that average with another self-esteem average based on the Rosenberg, for example, one found in a published article about mainstream elementary school children.

The **independent samples *t* test** compares the average values of a characteristic measured on a continuous scale between *two* subgroups of a categorical variable. For example, an independent samples *t* test would be used to assess the difference in income (measured in raw dollars) by gender (defined as male and female). The key to why it is called "independent" is because the two subcategories in the categorical variable (male and female) are operationally defined to be mutually exclusive and exhaustive: a participant according to this definition must either be male or female (thus mutually exclusive) and no other subcategory for gender is allowable (thus exhaustive).

The **dependent samples *t* test** compares the average values of a characteristic measured on a continuous scale between *two* conditions of the same group (e.g., assessment at Time 1 versus Time 2). For example, a dependent samples *t* test would be used to evaluate the improvement in depression levels, measured on a continuous scale, of a group involved in therapy at pre-test (before intervention) and at post-test (after intervention). Other common names for this test are the **matched-pairs *t* test** and **paired-samples *t* test**.

Chi Square Test of Association or Test for Independence

The **Chi square test of association** or **test for independence** analyzes the relationship between two categorical variables by comparing their proportions. For example, a Chi square test of association would be used to assess the relationship between gender (male and female) and being a perpetrator of domestic violence (yes or no). This test will evaluate if gender is related to perpetration.

ANOVA

ANOVA or **analysis of variance** is used to evaluate the difference in average scores measured on a continuous scale among one or more characteristics defined by categories. For example, a **one-way ANOVA** would be used to analyze the differences in self-esteem levels (the one continuous variable) across ethnic groups (the one categorical variable with two or more subcategories, i.e., White, Latino, Asian American/Pacific Islander, African/Black American, Native American, and Other). The one-way ANOVA is an extension of the independent samples *t* test in that it compares averages across two or more subgroups of a categorical variable.

A **two-way ANOVA** would be used to analyze the differences in self-esteem levels across two characteristics measured categorically, i.e., ethnic group and gender. It is also used to

test an interaction effect of the two categorical variables, i.e., whether being female and Latina is related to a particular self-esteem level compared to other ethnic and gender groups.

Pearson's Correlation

There are many forms of correlation, but a common one is **Pearson's correlation**. This is used to evaluate the relationship between two continuous variables, i.e., age measured in years and income in raw dollars. The r value indicates the direction and magnitude of the correlation relationship with a value between -1 and +1. Values closer to -1 or 1 indicate a stronger relationship whereas values close to 0 indicate a weaker relationship. A positive r value indicates that a high value in one variable is associated with a high value in the other variable (or a low value in one variable is associated with a low value in the other variable). For example, an older age is associated with a higher income. A negative r value indicates that a high value in one variable is associated with a low value in the other variable. For example, more time spent exercising (measured in minutes) is associated with lower levels of stress (measured on a stress scale).

Linear Regression and Logistic Regression

Linear regression is used to determine the relationship between independent and dependent variables by calculating an equation of a line that best represents the data. **Simple linear regression** examines the relationship of one continuous independent variable with one continuous dependent variable. **Multiple linear regression** examines the relationship of more than one continuous independent variable with one continuous dependent variable. **Multiple linear regression with dummy coding** examines the relationship of more than one independent variable (a set of predictors which includes both continuous and categorical variables) with one continuous dependent variable.

Logistic regression examines the relationship of more than one independent variable with one categorical dependent variable that is dichotomous (i.e., binary with only two subcategories). If the logistic regression includes categorical independent variables, dummy coding can also be used.

General Statistical Analysis Overview

The following chart lists these common tests, when to use them at the univariate, bivariate, and multivariate levels, and with which types of levels of measurement. See if you can figure out how the tests were selected for the life satisfaction of social work students example presented earlier.

General Statistical Analysis Overview

Univariate Statistics and Tests		
Variable		Statistic and Test
Categorical (Dichotomous) (Dichotomous or politimous)		Frequency, percentages, and mode Binomial test (p) One Variable Chi-Squared test (X^2 and p)
Continuous		Frequency, percentages, range, minimum and maximum, mode, median, mean, standard deviation
Bivariate Statistics and Tests		
Independent Variable	Dependent Variable	Statistic and Statistical Test
Categorical	Categorical	Crosstabs: cell frequencies and percentages Chi-Squared Test for Independence or Association (X^2 and p)
Categorical*** (Two independent groups) (Two dependent groups) (More than two independent groups)	Continuous*** —————→ —————→ —————→	Mean (sd) by group, and: Independent samples t test (t and p) Dependent samples t test (t and p) One-Way ANOVA with post-hoc test (F and p)
Continuous	Continuous	Pearson's Correlation (r and p) Simple Linear Regression (F , adjusted R^2 , b-coefficient, and p)

*** Note: For statistical test purposes, the IV and DV in your model can be switched in order to conduct an independent samples t test or a one-way ANOVA.

Multivariate Tests		
Independent Variables	Dependent Variable	Statistical Test
Two categorical variables	Continuous	Two-Way ANOVA (F and p)
Two or more continuous	Continuous	Multiple Linear Regression (F , adjusted R^2 , b-coefficient, and p)
Two or more continuous and/or categorical	Continuous	Multiple Linear Regression, with dummy coding (F , adjusted. R^2 , b-coefficient, and p)
Two or more continuous and/or categorical	Categorical (Dichotomous outcome)	Logistic Regression, with dummy coding (χ^2 , Cox & Snell R^2 , and p)

Your Turn

Think of your project and develop an analysis outline. Here are some basic steps to get you started:

- A. **Write out a clear, concise, and complete research statement and draw your model.**
- B. **Identify each of your variables, including the demographic and control variables.**
- C. **Identify the level of measurement for each variable according to the operational definitions used in your study.** Remember, any variable theoretically can have multiple operational definitions depending on how it is measured in the context of a particular study. For example, socioeconomic status could be defined as annual income in dollars or a combined measure of education level and current occupation. **Identify the level of measurement according to the operational definitions IN YOUR STUDY.**
- D. Outline your three levels of analysis (univariate, bivariate, and multivariate).

Remember all your model variables should be listed in the **univariate** section so that a basic analysis of each can be conducted. At the **bivariate** level, each independent variable is paired for analysis with your dependent variable. At the **multivariate** level, all independent variables are included in the analysis with the dependent variable, which enables you to look at the whole model at once.

Univariate / Descriptive Statistics and Tests		
Variable		Statistics and Test
Bivariate Statistics and Tests		
Independent Variable	Dependent Variable	Statistics and Test
Multivariate Tests		
Independent Variables	Dependent Variable	Statistics and Test

16. Basic Statistical Analysis Using SPSS

Below are brief instructions for conducting common statistical tests in SPSS. These steps may vary slightly among different versions of SPSS. These abbreviated instructions are NOT intended to replace your SPSS manual or detailed curriculum taught in the research sequence. You also will need to know your operational definitions, levels of measurement, and basic statistics in order to use these tests appropriately and interpret the computer output.

☞ Represents an initial mouse click ➡ Represents the next selection after the initial mouse click

Basic Descriptive Statistics

1. ☞ Analyze ➡ Descriptive Statistics ➡ Frequencies
2. Place the variables of interest into the Variable(s) area
3. ☞ Statistics button
4. Select the appropriate Dispersion and Central Tendency options, click Continue
5. ☞ OK

Binomial Test

1. ☞ Analyze ➡ Nonparametric Tests ➡ Binomial
2. Place the dichotomous categorical variable of interest into the Test Variable List area
3. ☞ OK

One Variable Chi Square Test

1. ☞ Analyze ➡ Nonparametric Tests ➡ Chi-Square
2. Place the categorical variable of interest into the Test Variable List area
3. ☞ OK

Chi Square Test of Association or Independence

1. ☞ Analyze ➡ Descriptive Statistics ➡ Crosstabs
2. Place the independent categorical variable in the Row(s) area and the dependent categorical variable in the Column(s) area
3. ☞ Statistics button, select the Chi-Square option, click Continue
4. ☞ Cells button, select the Observed and Expected Counts, and the all the Percentages options, click Continue
5. ☞ OK

Dependent Samples t Test (Match-Pairs t test and Paired-Samples t test)

1. ☞ Analyze ➡ Compare Means ➡ Paired-Samples t Test
2. Select the 2 continuous variables which must be paired (i.e., pre-test score and post-test score) and place into the Paired Variables area
3. ☞ OK

Independent Samples *t* Test

1. Analyze ➔ Compare Means ➔ Independent-Samples *t* Test
2. Place the categorical variable with 2 subcategories into the Grouping Variable area
3. Define Groups button, enter the codes for the 2 subcategories, click Continue
4. Place the continuous variable in the Test Variable(s) area
5. OK

One Way ANOVA

1. Analyze ➔ Compare Means ➔ One-Way ANOVA
2. Place the continuous variable into the Dependent List area and the categorical variable into the Factor area
3. Post Hoc button, select the Scheffe test, click Continue
4. Options button, select Descriptive, click Continue
5. OK

Pearson's Correlation (Product-Moment Correlation)

1. Analyze ➔ Correlate ➔ Bivariate
2. Place the continuous variables into the Variables area, leave selected options as is
3. OK

Simple Linear Regression and Multiple Linear Regression

1. Analyze ➔ Regression ➔ Linear
2. Place the continuous dependent variable into the Dependent area and the independent variable(s) into the Independent(s) area; (note that continuous independent variables can be analyzed as is but categorical independent variables must be dummy coded before placed into this procedure)
3. OK

Logistic Regression

1. Analyze ➔ Regression ➔ Binary Logistic
2. Place the categorical, binary dependent variable (must have only 2 subcategories) into the Dependent area and the independent variable(s) into the Covariates area; (note that continuous independent variables can be analyzed as is but categorical independent variables must be dummy coded before placed into this procedure)
3. Categorical button, place the categorical independent variables into the Categorical Covariates area, click Continue
4. OK

17. Data Tips and SPSS Settings

When it comes to learning SPSS and running your statistical analysis, nothing replaces a good teacher, a thorough SPSS guide, and of course *practice, practice, practice*. Below are some common procedures and tips that might prove useful.

Practical Safeguards

BACK-UP YOUR DATA! We often take this step for granted, but I guarantee that backing-up your data may someday save your life! I have become much more adamant about this advice because I have encountered so many students and colleagues losing precious information due to computer crashes and other mishaps. Keep multiple copies of your data, and store your back-up on a different device, whether it be on another computer, a flash drive, or a diskette. Simple data devices for back-up are available and affordable at your local office supply store. In vital situations, you might even want to send a copy of your data to a friend or a family member who live in a different geographical area from you. Disasters such as the Oakland Hills fire and Loma Prieta Earthquake destroyed the lifetime work of several academics, researchers, and professionals.

Protect Confidential Information. Encrypt or remove confidential information from your working data set. If you must retain or store certain records, keep them under lock and key. Your data might have private and sensitive information, including names, birthdates, and confidential case information such as medical or health conditions, financial or criminal records, or social security numbers.

Obtain Anti-Virus Software. The other major culprits to data problems are computer viruses. There are several good companies that will offer reasonably priced products to protect you against the latest threats.

More Than a Name: Using a Codebook

Develop a **codebook**, a concise but thorough manual that describes the details of your project's variables and data so that you or anyone else who needs this information can track the values, labels, and codes found in the data set.

Take the time to name and label all your variables in SPSS, and especially enter the values and names associated with your categorical variables. Although tedious at first, when you run your analyses and examine your output, these names and labels will make it much easier for you to read your results.

Familiarize Yourself with SPSS Options and Settings

Take the time to explore and learn what is in the SPSS menu bar (the list of commands engaged at the top of your SPSS screen) and the options under each of the pull down menus. Some useful options and settings:

Viewing Value Labels. To see your entered value labels in the SPSS data screen:

1. In the SPSS Data View,  View
2. Select the Value Labels option. This serves as a toggle switch if you would like to see either the labels or the values associated with the categorical variable information you have entered. Remember to enter the value labels first for this function to work.

Displaying the Variable and Value Names In the Output. To see the values and labels that you have assigned to your data set in the output of your analyses:

1.  Edit  Options  Output Labels
2. In the Outline Labeling and Pivot Table Labeling sections, select Names and Labels and Values and Labels for your settings.

Changing the Font. Often the font size of your data may be too large or too small. To adjust this:

1.  View
2. Select the Font option. In the Font window, change the settings to suit your needs.

Keep it Raw

When preparing your methodology and data collection, consider how to obtain the rawest form of information possible. Although you might not think you will need this level of detail, in most cases you will be thankful that you have it. You can always condense data, but you cannot expand its detail from a more general or summative form.

For example, if age is vital for your project, ask for this data via assessing date of birth or collecting the actual age of the participant in years. If you only offer a few check boxes (i.e., indicate if under 18 year old, between 18 and 35, between 36 and 55, and over 55) you cannot go back to assess actual age because only the categorical age data are available to you. But, if you collected the actual age, and then you wanted to collapse the age information into categories, you can always do this from the raw data while still retaining detailed ages if needed later.

Minimizing Missing Data

Collect as Complete Data as Possible. Missing data is one of your worse enemies in research and analysis. Missing data can result from participants leaving items blank due to poor wording or design of a questionnaire. Missing data can also result from refusals to answer particular questions, especially if they are about sensitive issues, or simply from the unavailability of that particular information. Without complete data, the quality of your project is threatened. When planning your study and collecting data, take extra care to minimize missing data.

Also, in practical terms, SPSS will not allow you to include participant data in many analyses unless information is available for all variables of interest. For example, you might successfully recruit 100 participants in your study of quality of life issues for older adults in residential care. You also carefully design an appropriate methodology including using a battery of culturally-appropriate, standardized questionnaires. However, for various reasons, 27 of the participants refuse to provide their birthdates or forget to complete that item useful to determine their age. If your univariate, bivariate, and multivariate analyses rely on age as one of the key variables, the missing data on these 27 participants reduces your hard-earned sample size from 100 to 73, cutting your original sample size by over 25%.

Managing Missing Data. What if you have missing data? There are various strategies to manage missing data. Check with your professors about their preferences, and the pros and cons for each. Here are some options:

1. **Find the Missing Data.** Sometimes you will be able to go back to your data source to complete your data set.
2. **Consider the Mean Replacement Method.** Some researchers will use an average score calculated from the available data to fill-in missing data points. This mean replacement method is used to fill-in data within a case and among cases.
3. **Exclude the Cases With Missing Data.** A conservative researcher will exclude the cases with missing data. This might be out of reality, as cases cannot be analyzed without complete information, or the philosophy that reliable and valid data cannot be generated except from the participants themselves.

Whatever method you use to manage missing data, make sure you have a good argument behind it and that you explain clearly your procedures in your research report.

18. Common SPSS Procedures

Recoding Variables

Recoding variables is necessary when we want to collapse raw data into categories or reassign new codes to old ones to improve our management of data. This can be done for categorical and continuous variables, BUT you as a researcher must decide whether the recoding is conceptually useful for your project. **Remember that we would usually keep continuous variables in their raw form so that more options for data analysis are available to us later.**

Always enter your data in as raw a form as possible, and if you recode, do so into a different variable to retain the original information. This means using the SPSS procedures to "Recode Into Different Variable" rather than to "Recode Into Same Variable."

ALWAYS recode into a different variable just in case you make a mistake. If you make an error while recoding into the same variable, and do not catch it, you will have corrupted your original data set. If you recode into a different variable and make an error, you can go back to your original variable and redo the procedure.

Example of Ethnicity (self-identified ethnic group of origin)

Let's assume our child welfare project included raw data on each client's ethnicity. The output might look like that listed under the variable "Ethnic" in the table below. Remember, always enter or keep your original data in as raw a form as possible, and if you recode, do so into a different variable to retain the original information.

In this example, keeping all 25 categories for ethnicity would complicate our analysis, and probably not be very useful. Also note that some categories might be considered synonymous (i.e., English and White and Caucasian) and so these need to be managed as well. So, we would usually decide to collapse these into fewer categories while also retaining some distinction. In the example of our variable "Ethnic", we could recode into 5 categories under a new variable called "Ethnic2." If we need the raw data later, we can always refer back to the original "Ethnic" variable.

Variable = Ethnic		
Code (Value)	Ethnicity (Value Label)	Frequency
1	African American	21
2	American Indian	4
3	Biracial	1
4	Black	12
5	Brazilian	4
6	Canadian	8
7	Caucasian	87
8	Chinese	12
9	English	4
10	Ethiopian	1
11	French	5
12	German	1
13	Indian	5
14	Japanese	5
15	Korean	2
16	Latino	39
17	Mexican	12
18	Middle Eastern	22
19	Native American	2
20	Filipino	4
21	Russian	8
22	South African	1
23	South American	1
24	Vietnamese	9
25	White	23
		N = 293

Variable = Ethnic2		
Code (Value)	Recoded Ethnicity (Value Label)	Frequency
1	White	137
2	Black	34
3	Latino	56
4	Asian	37
5	Other	29
		N = 293

How YOU choose to collapse your variables will depend on your project's focus, the level of detail needed, and available sample size. For instance, if ethnicity were the most important variable in your study, you might retain more subcategories (more than the 5 we have above), or if retaining the ethnicity detail is not vital or not possible due to a small sample size overall or of a particular group, you might only have 2 categories: ethnic majority and ethnic minority. Also, choose variable and categorical labels that are as appropriate and culturally sensitive as possible for your study and audience.

Compute Function

The compute function is often used to derive a total or average score of a measure based on multiple items on a questionnaire. Thus, calculating new variables is necessary when we want to use a formula to convert raw scores into values to match our operational definitions. For example, the Center for Epidemiological Studies Depression Scale (CES-D) is a 20-item instrument measured on a Likert scale used to assess depression, and depression is operationally defined as the total of the responses to these items. SPSS can be used to compute the total depression score from the inputted information of the 20 items instead of you calculating the sum of these 20 items by hand.

Calculating Sum and Mean Scores. Two of the common mathematical functions used in the compute function are the “sum” and “mean” functions. If you have a multi-item questionnaire or inventory used to measure a concept, the operational definition should include instructions for how to derive a score based on the total or the items (the sum), or the average of the items (the mean). These are described below.

Sum Scores from Multiple Item Questionnaires. A common use of the computing function is calculating a total or **sum** score of a characteristic based on multiple items on a questionnaire.

For example, if we are interested in assessing self-esteem of youth, we might choose to administer the Rosenberg Self-Esteem Inventory (SEI) as part of our study. This self-esteem inventory has various editions, but for our example we will operationally define it as a 10-item questionnaire measured on a Likert scale from 1 to 4, with 1 being "strongly disagree", 2 "disagree", 3 "agree", and 4 "strongly agree." Participants are asked to rate each of the 10 items, for example item #1 is "*On the whole, I am satisfied with myself*" and item #2 is "*At times I think I am no good at all.*" In the SEI, items #2, #5, #6, #8, and #9 are **reverse worded**. The total range of scores is from 10 to 40, with higher scores meaning higher self-esteem and lower scores lower self-esteem. A raw data set with the SEI and its 10 items might look like this:

ID#	SEI Item 1	SEI Item 2	SEI Item 3	SEI Item 4	SEI Item 5	SEI Item 6	SEI Item 7	SEI Item 8	SEI Item 9	SEI Item 10
1	1	3	4	1	3	4	1	2	1	3
2	2	2	2	2	2	2	2	4	2	1
3	3	3	1	3	3	1	3	2	3	2
4	2	2	4	2	2	4	2	1	2	3
5	1	1	3	1	1	3	1	2	2	1

Reverse-Worded Items. This example’s operational definition and sample items indicate that a few items, for example item #2, are worded in an opposite fashion, meaning that a youth’s indication of a 3, or "agree", to item #2 actually indicates LOW self-esteem. This is called a reverse-worded item, and these types of questions are purposefully included and commonly found in several psychosocial instruments to reduce response bias and increase the validity and reliability of the survey. To score the SEI correctly, we must first RECODE (using the SPSS procedure) the scores for these particular items so that all the values are calculated in the same direction to fulfill our operational definition. If you do not recode these reverse-worded items, your total score will be invalid.

You can use SPSS to calculate this instead of doing the math by hand, which is very useful especially if you have a large data set with instruments with several items. Conceptually, the formula for total self-esteem:

$$\text{Total Self-Esteem Score} = \text{SEI 1} + \text{SEI 2} + \text{SEI 3} + \text{SEI 4} + \text{SEI 5} + \text{SEI 6} + \text{SEI 7} + \text{SEI 8} + \text{SEI 9} + \text{SEI 10}$$

Taking into account that SEI items #2, #5, #6, #8, and #9 are reverse-worded, and also our recoding procedure, the formula is more accurately stated as:

$$\text{Total Self-Esteem Score} = \text{SEI 1} + \text{RECODED SEI 2} + \text{SEI 3} + \text{SEI 4} + \text{RECODED SEI 5} + \text{RECODED SEI 6} + \text{SEI 7} + \text{RECODED SEI 8} + \text{RECODED SEI 9} + \text{SEI 10}$$

Mean Scores from Multiple Item Questionnaires. Another common use of the computing function is calculating an average or **mean** score of a characteristic based on multiple items on a questionnaire.

For example, if we are interested in assessing the level of social support among single parents, we might choose to administer a Social Support Questionnaire (SSQ) as part of our study. This SSQ is operationally defined as a 5-item questionnaire measured on a Likert scale from 0 to 4, with 0 being "strongly disagree", 1 "disagree", 2 "neither agree nor disagree", 3 "agree", and 4 "strongly agree. Participants are asked to rate each of the 5 items, for example item #1 is "***I have a group of close friends I can rely on***" and item #2 is "***I have family members to go to when I need help.***" The scoring instructions for the SSQ call for calculating the average of the 5 items, thus the range of the total support score is from 0 to 4, with higher scores meaning higher social support and lower scores lower social support. The raw data with the SSQ and its 5 items might look like this:

ID#	SSQ Item 1	SSQ Item 2	SSQ Item 3	SSQ Item 4	SSQ Item 5
1	1	2	0	3	3
2	2	2	3	3	4
3	2	2	1	1	3
4	3	4	4	3	2
5	0	0	1	2	1

Again, as with the sum, you can use SPSS to calculate the SSQ mean score instead of doing the math by hand. Conceptually, the formula for the SSQ score:

$$\text{Social Support Score} = (\text{SSQ 1} + \text{SSQ 2} + \text{SSQ 3} + \text{SSQ 4} + \text{SSQ 5}) / 5 \text{ items}$$

Calculating Mean Scores Instead of Sum Scores To Compensate for Missing Data.

Another use of the mean computing function is to compensate for missing data. This calculation of an average or **mean** score does not necessarily rely on having information full responses from a multi-item instrument. For example, let's say participant #2 (ID#2) refused to answer item #2 (SSQ Item 2) and participant #4 (ID#4) forgot to answer items #1 and #3 (SSQ Items 1 and 3).

ID#	SSQ Item 1	SSQ Item 2	SSQ Item 3	SSQ Item 4	SSQ Item 5
1	1	2	0	3	3
2	2		3	3	4
3	2	2	1	1	3
4		4		3	2
5	0	0	1	2	1

If you could not obtain the missing information and you did NOT want to exclude these two participants for missing data, you could use the MEAN compute function to calculate a score based on available data. This procedure also would retain the same range of scores (i.e., 0 to 4) regardless of the number of items used for the calculation. In concept you are calculating:

Social Support Score = MEAN of available items SSQ 1, SSQ 2, SSQ 3, SSQ 4, SSQ 5

For example, for cases ID#1, #3, and #5, SPSS would calculate:

Social Support Score = (SSQ 1 + SSQ 2 + SSQ 3 + SSQ 4 + SSQ 5) / 5 items

But for ID#2, SPSS would calculate:

Social Support Score = (SSQ 1 + SSQ 3 + SSQ 4 + SSQ 5) / 4 items

And for ID#4, SPSS would calculate:

Social Support Score = (SSQ 2 + SSQ 4 + SSQ 5) / 3 items

Remember that the advantage of this method would be to retain your cases, preserving your sample size, but the disadvantages are threats to the validity of your study. Whatever method you use to calculate scores and manage missing data, make sure you have a good argument behind it and that you explain clearly your procedures in your research report.

Age Calculation From Birth Date. One other common computation is to find age from a birth date.

ID#	Birthday	Today
1	01/02/1981	8/31/2007
2	05/06/1984	8/31/2007
3	03/31/1972	8/31/2007
4	11/11/1969	8/31/2007
5	06/06/1985	8/31/2007

Make sure you have complete data for each participant's birth date (month, day, and year). In the SPSS Variable View, your variable should be a date variable type. Conceptually, you are subtracting today's date (Today) from the date of birth (Birthday) to get the actual age:

$$\text{Age} = \text{Today} - \text{Birthday}$$

19. SPSS Exercise On Basic Recoding and Computing

In this example, a pilot study examined stress and access to health services as predictors of overall well-being while controlling for sex, ethnicity, age, and annual income. Ten participants were recruited for this project. After following proper ethical procedures, including obtaining informed consent, participants were asked to complete a short questionnaire. A draft of a codebook was also created to help organize and track the data.

ID#: _____ Date Administered: _____

Well-Being Study

Please complete the following items as best as possible.

1. Sex (circle one): female male
2. Date of birth (fill in month/day/year): ___ / ___ / ____
3. Ethnicity (fill in): _____
4. Annual income in dollars (fill in amount): \$ _____
5. Do you access health services regularly, i.e. at least once a year? (please circle one): No Yes

Questions 6 through 8 refer to aspects of well-being. On a scale of 1 to 5 with 1=poor, 2=fair, 3=average, 4=good, and 5=excellent, please circle the rating that best fits you.

6. My physical well-being:	1 2 3 4 5
7. My psychological well-being:	1 2 3 4 5
8. My spiritual well-being:	1 2 3 4 5

Questions 9 through 11 ask about stress. On a scale of 1 to 4 with 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree, please circle the rating that best fits you.

9. I am easily stressed by life circumstances:	1 2 3 4
10. I have good coping skills:	1 2 3 4
11. Everyday events bother me:	1 2 3 4

Thank you for your participation.

Draft Codebook - Well-Being Study

Sex [sex]: 0 = Female
1 = Male

Date of Birth [DOB]: enter as date variable

Ethnicity [ethnic]: enter separate code for each unique response

1 = Irish American
2 = White
3 = Latino
4 = Mexican American
5 = Chinese
6 = African American
7 = Black
8 = Navajo

Annual Income [income]: enter as raw amount

Access to Services [services]: 0 = No
1 = Yes

Well-being:

- Enter items 6, 7, and 8 as WB1, WB2, WB3
- Compute total well-being [**wbtotal**] WB1 + WB2 + WB3 OR sum (WB1,WB2,WB3)

Stress:

- Enter items 9, 10, and 11 as Stress1, Stress2, Stress3
- Recode reverse-worded item Stress2 as 1=4, 2=3, 3=2, 4=1 [**r.str2**]
- Compute average stress [**str.avg**] as ((Stress1 + r.str2 + Stress3)/3) OR mean (Stress1,r.str2,Stress3)

Enter the raw data which appears in the next table into SPSS. Remember to name and label all your variables. Also, give values and value names to the subcategories of the categorical variables.

ID#	Sex	Ethnic	DOB	Income	Services	WB1	WB2	WB3	Stress1	Stress2	Stress3
1	0	1	01/02/1974	60000	1	4	4	5	2	3	2
2	0	2	05/06/1984	40500	1	3	3	4	3	2	4
3	0	3	03/31/1972	30000	0	3	3	3	3	2	3
4	1	4	11/11/1968	32000	1	3	3	3	3	2	3
5	1	5	06/06/1969	55000	1	3	4	3	2	3	3
6	1	2	04/12/1966	100000	1	4	4	4	4	2	2
7	1	6	02/14/1976	23000	0	2	2	4	3	2	3
8	0	7	10/31/1976	45000	0	1	2	4	3	1	3
9	0	8	08/04/1962	21000	0	3	3	3	3	2	3
10	0	2	04/01/1981	35000	0	2	2	3	3	1	4

Recoding a Variable

In our example, we will recode the ethnicity responses from our participants in the variable “Ethnic” into a new variable “Ethnic2” with 5 subcategories (1=White, 2=Black, 3=Latino, 4=Asian/PI, and 5=Native American):

1. Transform Recode Into Different Variables. A dialogue box named “Recode into Different Variables” should appear.
2. Select the “Ethnic” first variable to be recoded and click the arrow to pop it into the middle Input Variable Output Variable box.
3. Type the name of your recoded variable “Ethnic2” in the Name box of the Output Variable Section. Label it “recoded ethnicity”. the Change button.
4. Old and New Values, a dialogue box “Recode into Different Variables: Old and New Values” should appear.
5. Look at your codebook for the original categories and figure out the procedures about how to create the new values for your recoded variable. Continue when ready and then OK. Check to see if the newly recoded variable “Ethnic2” appears in your data set.
6. When you are done recoding, check your new variable by running the frequencies to compare your original variable “Ethnic” with your newly recoded variable “Ethnic2”. The frequencies should add-up correctly between the two variables.
7. Save your data file.

Computing a Variable

Next, calculate the total well-being score. Remember to look at your codebook and the operation definition to figure out how to compute this well-being score:

1. Look for your entered data for the 3 well-being items (WB1, WB2, WB3).
2. Check if any recoding of reverse-worded items is necessary.

3.  Transform  Compute. A dialogue box named “Compute Variable” should appear.
4. In the Target Variable box, type in “wbtotal”.
5. Typing in the Numeric Expression box so that you have “wbtotal” =

(SUM(WB1, WB2, WB3))

[Note that you can also find the SUM command in the Function Group listed under Statistical on the right hand of the Compute Variable window]

6.  OK, and see if the newly computed well-being total variable “wbtotal” appears in your data set.
7. Check your new variable by running the frequencies and setting the statistics to report the mean and standard deviation of “wbtotal”.
8. Save your data file.

Next, calculate the average stress score:

1. Look for your entered data for the 3 stress items (Stress1, Stress2, Stress3)
2. Recode the reverse-worded item “Stress2” into a new variable “r.str2”. Recall your recoding procedures and in this case, the values for that item should be reassigned so that 1=4, 2=3, 3=2, and 4=1.
3. After the recoding of the reverse-worded item,  Transform  Compute. A dialogue box named “Compute Variable” should appear.
4. In the Target Variable box, type in “str.avg”.
5. Typing in the Numeric Expression box so that conceptually you have “str.avg” =

(MEAN(Stress1,r.str2,Stress3))

[Note that you can also find the MEAN command in the Function Group listed under Statistical on the right hand of the Compute Variable window]

6.  OK, and see if the newly computed average stress variable “str.avg” appears in your data set.
7. Check your new variable by running the frequencies and setting the statistics to report the mean and standard deviation of “str.avg”.
8. Save your data file.

To calculate current age:

1. Create a new variable called “today” in your data set.
2. In that variable “today”, type in the current date. For the sake of our example, use 8/31/2007. You can copy and paste this date for the each subject.
3.  Transform  Compute. A dialogue box named “Compute Variable” should appear.
4. In the Target Variable box, type in “age”
5. Select your “today” variable and click the arrow to pop it into the Numeric Expression box.
6. Select your “DOB” variable and click the arrow to pop it into the Numeric Expression box.
7. Typing in the Numeric Expression box so that “age” =

$$((((today - DOB)/365)/24)/60)/60)$$

8.  OK, and see if the newly computed age variable appears in your data set. Note that this is a result calculated in years, and will have decimal points (fractions of years) included.

The reason for the $/365)/24)/60)/60$ part is because SPSS calculates the time difference of two dates in seconds; it needs to be converted keeping in mind that there are 365 days in a year, 24 hours in a day, 60 minutes in an hour, and 60 seconds in a minute. Yes, I know... one of those unusual stories in computing.

9. Check your new variable by running the frequencies and setting the statistics to report the mean and standard deviation of “age”.
10. Save your data file.

Checking and Knowing Your Data

Running frequencies and descriptive statistics on your data set will help familiarize you with your project information and serve as a way to check for errors in data entry and recoding. Run the basic descriptive statistics on the example data set:

1.  Analyze  Descriptive Statistics  Frequencies.
2. Place the variables of interest into the Variable(s) area.
3.  Statistics button.
4. Select the appropriate Dispersion and Central Tendency options, click Continue.
5.  OK.

Only a few of the SPSS tables are printed here, but your output should look something like what is displayed below. Also note the following:

1. **Know which statistics are valid to interpret.** Although SPSS will calculate all the statistics, not all are valid to interpret. For example, SPSS will calculate an average of a categorical variable (e.g., sex and ethnicity) *but you as the researcher should know that there is no such thing as an average of a categorical variable.* Why are we placing all the variables (categorical and continuous) in at once into this procedure? It would be cumbersome to run descriptive statistics on each variable one by one. Analyzing all the variables at once in the descriptive statistics procedures is for expedience, but you as the social work researcher must know WHICH statistics are legitimate to use.
2. **Examine the descriptive statistics for errors in demographics.** For example, you would assume that a reasonable income range for your sample is between \$20,000 and \$100,000 or that only a few different ethnicities would be reported. So if you find codes or values out of these reasonable ranges, you know to look for errors in data entry, recoding, or computing.
3. **Examine the descriptive statistics for errors in your psychosocial and other variables and measures.** For example, from the operational definitions of well-being and stress, you know that the scores must fall within a certain range. Again, if you find codes or values out of these operationally defined ranges, you know to look for errors in data entry, recoding, or computing.

Frequencies

Statistics

		Sex	Ethnic Ethnicity	Ethnic2 Recoded Ethnicity	DOB	age
N	Valid	10	10	10	10	10
	Missing	0	0	0	0	0
Mean		.40	4.00	2.30	03/12/73	34.4912
Median		.00	3.50	2.00	02/15/73	34.5616
Mode		0	2	1	08/04/62 ^a	23.33 ^a
Std. Deviation		.516	2.404	1.418	2453	6.71933
Minimum		0	1	1	08/04/62	23.33
Maximum		1	8	5	05/06/84	45.10

Remember that reviewing your descriptive statistics will help you find data errors.

Also remember that not all statistics are legitimate to interpret.

a. Multiple modes exist. The smallest value is shown

Means and standard deviations **cannot** be interpreted for categorical variables.

Statistics

		Income	Services	WB1	WB2	WB3	wbtotal
N	Valid	10	10	10	10	10	10
	Missing	0	0	0	0	0	0
Mean		44150.00	.50	2.80	3.00	3.60	9.4000
Median		37750.00	.50	3.00	3.00	3.50	9.0000
Mode		21000 ^a	0 ^a	3	3	3	9.00
Std. Deviation		23373.834	.527	.919	.816	.699	1.95505
Minimum		21000	0	1	2	3	7.00
Maximum		100000	1	4	4	5	13.00

a. Multiple modes exist. The smallest value is shown

Means and standard deviations **can** be interpreted for continuous variables.

Statistics

		Stress1	Stress2	r.str2 recoded Stress2	Stress3	str.avg
N	Valid	10	10	10	10	10
	Missing	0	0	0	0	0
Mean		2.90	2.00	3.0000	3.00	2.9667
Median		3.00	2.00	3.0000	3.00	3.0000
Mode		3	2	3.00	3	3.00
Std. Deviation		.568	.667	.66667	.667	.48305
Minimum		2	1	2.00	2	2.00
Maximum		4	3	4.00	4	3.67

Frequency Table

Sex

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0 Female	6	60.0	60.0	60.0
1 Male	4	40.0	40.0	100.0
Total	10	100.0	100.0	

Frequency tables provide the number of participants with a particular response and the respective percentage. These tables also help with your data checking, and are useful for categorical variables.

Ethnic Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Irish American	1	10.0	10.0	10.0
	2 White	3	30.0	30.0	40.0
	3 Latino	1	10.0	10.0	50.0
	4 Mexican American	1	10.0	10.0	60.0
	5 Chinese	1	10.0	10.0	70.0
	6 African American	1	10.0	10.0	80.0
	7 Black	1	10.0	10.0	90.0
	8 Navajo	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

Ethnic2 Recoded Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 White	4	40.0	40.0	40.0
	2 Black	2	20.0	20.0	60.0
	3 Latino	2	20.0	20.0	80.0
	4 Asian/PI	1	10.0	10.0	90.0
	5 Native American	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	23.33	1	10.0	10.0	10.0
	26.43	1	10.0	10.0	20.0
	30.85	1	10.0	10.0	30.0
	31.56	1	10.0	10.0	40.0
	33.68	1	10.0	10.0	50.0
	35.44	1	10.0	10.0	60.0
	38.26	1	10.0	10.0	70.0
	38.83	1	10.0	10.0	80.0
	41.41	1	10.0	10.0	90.0
	45.10	1	10.0	10.0	100.0
	Total	10	100.0	100.0	

Although these tables help with your data checking, they are not as useful for summarizing information about continuous variables. The descriptive statistics in the summary table above are normally used instead of frequencies and percentages.

Syntax: Learning SPSS Program Commands Without the Point-and-Click

Before Apple/Mac and Microsoft Windows developed the point-and-click method, researchers and statisticians typed out programming language and computer commands by hand, a process using **syntax**: rules and procedures that govern the structure and running of computer commands.

Early versions of SPSS also relied on syntax. Although most users today appreciate the point-and-click method to facilitate their learning of statistics and statistical programs, using the point-and-click method to manage and analyze fairly large and detailed data sets can be cumbersome and extremely time consuming. For instance, in the recode and compute commands, imagine having to create and calculate not just a few variables, but hundreds of them. It would take a tremendous amount of energy using the point-and-click method.

Thus, SPSS Windows and Mac software versions have retained the option to create and use **syntax files**. Some of you might find syntax useful, and although the point-and-click method is the most user-friendly, it is not necessarily the most efficient. I recommend at least trying some syntax commands.

In our example above about stress and access to health services as predictors of overall well-being while controlling for sex, ethnicity, age, and annual income, the following syntax file can be used to compliment your data management. Enter the raw data, and then try this:

1. Make sure your example data file is open in SPSS and that all the raw data has been entered.

To see the effects of the syntax, you will also need to use another version of your raw data in this example WITHOUT any of the recoding or computing of the new variables already done. If you start with your modified data set, the syntax here just repeats much of what is already there, hiding its effects.

The simplest way to start with your raw data is to save a second copy of your working data file under a new name, delete the newly recoded and computed variables created previously, and save again under that new file name so as to keep your valuable work preserved in the first data file.

2. In SPSS,  File  New  Syntax
3. In that new syntax file, type in word for word and symbol for symbol, the text and commands in the box below.

With syntax and computer programming language, the slightest difference in punctuation, spelling, and order of commands will make a difference and possibly prevent the file from running. Be careful and accurate.

4. Use your mouse to highlight all the lines and commands in the syntax file; it is ok to also highlight the asterisked ones as the asterisks will tell the computer to skip those lines.

5.  Run  All, or find the play  icon button in the command bar below the menu bar. If you typed in everything correctly, you will notice the new variables created and calculated for you. If there are mistakes, the output file often reports where you have made an error.
6. After you have your final version of the syntax file, save it.

```

*** Example of an SPSS syntax file
*** Ask your professor or consult an SPSS manual for additional tips
*** Using asterisks at the beginning of a line signals to SPSS NOT to run that line
*** Often we use the asterisks to type in useful notes about our data

*** Value labels command for "Ethnic" variable
*** Sometimes much easier to do syntax than using the point-and-click method

VALUE LABELS Ethnic
1 "Irish American"
2 "White"
3 "Latino"
4 "Mexican American"
5 "Chinese"
6 "African American"
7 "Black"
8 "Navajo".

*** Recode Into Different Variable command for "Ethnic" to "Ethnic2" variable
*** Once you have a template for these commands, you can copy and edit syntax to run other procedures

RECODE
  Ethnic
  (1=1) (2=1) (3=3) (4=3) (5=4) (6=2) (7=2) (8=5) INTO Ethnic2 .
VARIABLE LABELS Ethnic2 'Recoded Ethnicity'.
EXECUTE .

VALUE LABELS Ethnic2
1 "White"
2 "Black"
3 "Latino"
4 "Asian/PI"
5 "Native American".

*** Compute command for total well-being variable "wbtotal"

COMPUTE wbtotal = (SUM(WB1,WB2,WB3)) .
EXECUTE .

*** Recode Into Different Variable command for "Stress2" to "r.str2" variable
*** Remember reverse-worded items

RECODE
  Stress2
  (1=4) (2=3) (3=2) (4=1) INTO r.str2 .
VARIABLE LABELS r.str2 'recoded Stress2'.
EXECUTE .

*** Compute command for Stress Score "str.avg"

COMPUTE str.avg = (MEAN(Stress1,r.str2,Stress3)) .
EXECUTE .

*** Compute command for "age" from date of birth (DOB) and "today"
*** Remember to create your "today" variable first or this step won't work

COMPUTE age = (((today - dob)/365)/24)/60/60 .
EXECUTE .

```

Partial Answer Key

There is a range of acceptable answers to the exercises in the supplement. Hopefully the brief answers below will help you evaluate your understanding of basic research terms and their application.

2. Wise Consumers of Research

The infamous “answers will vary.”

3. Follow Your Passion - Selecting a Research Topic

Answers will vary.

4. Research and Scientific Inquiry

Answers will vary.

5. Quantitative Versus Qualitative Research

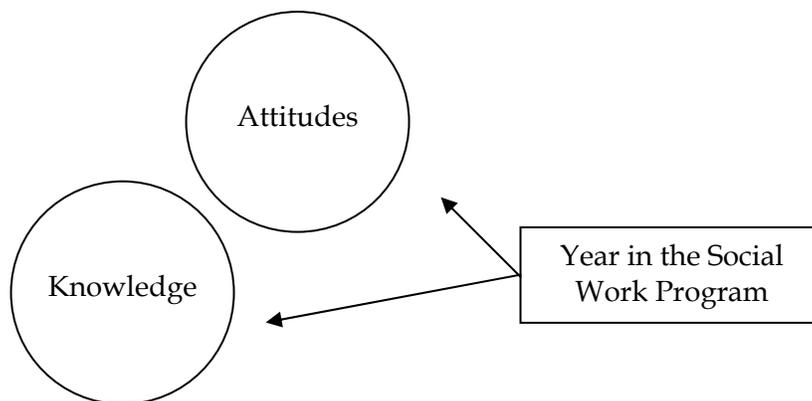
Answers will vary.

6. Building a Model – Thinking of Variables and the Relationships Among Them

Answers will vary.

7. Examining Research Topics and Terms

Scenario A



Problem/Issue:

Preparation of social work students to address cancer and cancer related issues

Research Statement:

“This study will examine the differences in knowledge and attitudes regarding cancer and cancer related issues among first- and final-year social work students.”

Dependent Variables:

Knowledge about cancer and cancer related issues

Attitudes about cancer and cancer related issues

Independent Variable:

Year of the student

Hypotheses:

Since there is one independent variable and two dependent variables, technically two hypotheses need to be accounted for. These can be expressed in two sentences or in one, as long as all the hypothesized relationships are included:

“It is hypothesized that knowledge about cancer and cancer related issues (scores measured by the Whatsit Scale) will vary by year in the social work program. It is also hypothesized that attitudes about cancer and cancer related issues (scores measured by the Whatsit Scale) will vary by year in the social work program.”

Or,

“It is hypothesized that both knowledge and attitudes about cancer and cancer related issues (scores measured by the Whatsit Scale) will vary by year in the social work program.”

Regardless of its presentation, these are both non-directional hypotheses because they do pose a relationship between the independent variable and each of the two dependent variables, but they do not specify which particular year of the student will score higher (or lower) than the other in knowledge and attitude.

- What research question(s) could one ask if a qualitative component were added to this study? What themes might be found?

Possible questions include “What is your knowledge and attitude towards cancer and cancer related issues?” or “Why do you have particular attitudes towards learning about cancer and cancer-related issues?”

Themes would be assessed from the open-ended responses to the qualitative questions.

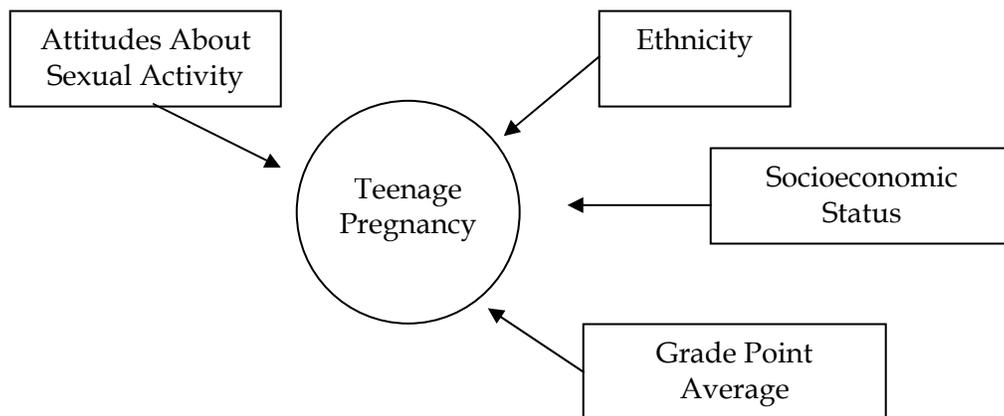
- Operational Definitions:

Year in the social work program is operationally defined as the designation of a student as either first-year or final-year.

Knowledge and attitudes about cancer and cancer related issues are both defined by the scores measured by the Whatsit Scale. You would also include the author and details of an instrument as part of the operational definition when available.

Note: These operational definitions are specific to the scenario. There are many possible definitions to the same concept. You would select one that is appropriate for your study.

Scenario B



Problem/Issue:

Pregnant and parenting teenagers

Research Statement:

“This study will examine attitudes about sexual activity as a predictor to teenage pregnancy while controlling for socioeconomic status (SES), grade point average (GPA), and ethnicity.”

Dependent Variable:

Teenage pregnancy

Independent Variables:

Attitudes about sexual activity

Socioeconomic status

Grade point average

Ethnicity

Hypotheses:

Since there are four independent variables and one dependent variable, four relationships need to be accounted for in the hypotheses. These can be stated in four sentences, but can also be more eloquently presented in a few sentences:

“It is hypothesized that a more promiscuous sexual attitude would be related to a teenager being pregnant. It is also hypothesized that pregnancy condition would vary by SES, GPA, and ethnicity.

The hypothesis regarding sexual attitudes and pregnancy is a directional hypothesis. The hypotheses regarding SES, GPA, and ethnicity are all non-directional.

- What research question(s) could one ask if a qualitative component were added to this study? What themes might be found?

Possible questions include “Why do teenagers form certain attitudes about sex?” or “How does SES, GPA, and ethnicity influence sexual attitudes?”

Themes would be assessed from the open-ended responses to the qualitative questions.

- Operational Definitions:

Sexual attitude is operationally defined as the scores generated from the OHGEE Instrument of Sexual Attitudes. You would also include the author and details of an instrument as part of the operational definition when available.

Pregnancy is operationally defined from the self-reported response on a demographics questionnaire assessing pregnancy (pregnant vs. non-pregnant). Similarly, socioeconomic status (SES) is defined from the selection among three levels, low, medium, or high. Grade point average (GPA) is defined as the mean score of marks earned in school, ranging from 0 to 4, with A = 4 points, B = 3 points, C = 2 points, D = 1 point, and F = 0 points. Ethnicity is the self-reported culture, race, or group of origin, White, Black, Latina, or Asian.

Note: These operational definitions are specific to the scenario. There are many possible definitions to the same concept. You would select one that is appropriate for your study.

Scenario C

You can do it! Compare your answers with classmates.

8. Evaluating Ethics in Research

Scenario A

Your answers can include:

Coercion since the potential participants might be desperate for assistance. It is not clear if **sufficient information** was given, and it is unknown if the clients are **competent** to give informed consent. Dr. Ghotatryit breached **confidentiality** and **privacy**. No mention was made about submitting his study to an **institutional review board (IRB)** or **human subjects committee**. **Cost/benefit** analysis: it is uncertain if there was a clear benefit given the cost, specifically spending \$1,000,000 to help 100 clients, translating to \$10,000 per patch. Although effective, would the intervention be affordable to future clients?

You would rectify these issues by addressing each concern, i.e., submitting the proposal to an IRB, protecting the identity of the clients and the agencies, and providing thorough information to the participants as part of evaluating their competence to be in the study.

Scenario B

You can do it! Compare your answers with classmates.

9. Sampling Scenarios

Scenario 1

Types of probability sampling would be unfeasible given the special population. Snowball sampling might be effective by relying on the initial, key participants to help Costner and Connery locate and recruit other participants.

Scenario 2

Cluster sampling or a form of stratified random sampling would be appropriate given Cruise and Hoffman's interest in a generalizable and representative sample, and their available funding for a large number of participants. At minimum, a type of probability sampling should be implemented.

Scenario 3

Given the need for gender proportion similar to NASW's roles and their intended sample size, proportionate stratified random sampling would be ideal.

Scenario 4

Quota sampling would help Stiller and DeNiro in their study needing an equal representation of Asian American, African American, Latino, and European American married couples, but having access only to one center.

Scenario 5

Cluster sampling would be appropriate given the need for representation across the nation.

Scenario 6

Since Moore's study appears exploratory, and that his potential participants are difficult to access, Snowball sampling would be an appropriate option.

Scenario 7

Proportionate stratified random sampling would be ideal so that the large sample of participants would resemble percentages found in the national census.

Scenario 8

Shatner and Nemoy could use convenience sampling given their low budget and access to one local naval base.

10. Measurement Exercise

Note: These levels of measurement and operational definitions are specific to the scenario. There are available many definitions to the same concept, and the level of measurement will depend on the definitions you select for your study variables.

Ethnicity:	categorical and nominal
Years lived in the United States:	continuous and ratio
Number of children:	continuous and ratio
Family's annual income:	continuous and ratio
Time spent with children:	categorical and ordinal
*** Stress level:	continuous and interval
*** Quality of the parent-child relationship:	continuous and interval

*** **Note:** If you consider Likert scales continuous in nature, then stress level and quality of parent-child relationships in this scenario are continuous and interval variables. If you are conservative in your definitions of measurement, then these two are categorical and ordinal.

11. Establishing Validity and Reliability of Measures

Answers will vary. Check your text about how each type of validity and reliability is established and used. However, analyzing both scenarios should remind you about some common procedures unitized in many studies.

Regarding validity, at least face validity should be addressed to improve the accuracy of your instrument. It is the most straight-forward procedure possible: to ensure that the questions or items in an instrument ask what they intend to ask and measure what they intend to measure. You might be surprised how often questionnaires are so poorly worded that the information gathered is worthless.

Regarding reliability, test-retest and alpha reliability are very common in order to establish the consistency of the instrument in measuring data.

There are other practical and useful procedures to improve the validity and reliability. **Pilot testing** is a proofreading and trial-run of your instrument. This is usually done as a formal step in instrument design with a subsample of participants within your population of interest. However, if using a formal subsample is unfeasible, using peers, colleagues, or experts to review a questionnaire can be extremely helpful to minimize the chance of major errors.

Assessing the **cultural appropriateness**, including the accuracy of an instrument's **translation** (via translation and back-translation) is another important procedure. Some terms and concepts are culture-specific, and might not be understood in the same way with all people. For example, what our profession recognizes as clinical depression is very different from how other cultures understand and conceptualize this condition, and our psychosocial assessment strategies will not apply universally. Some topics are "taboo" or sensitive, and to even ask certain questions without proper stakeholder support and preparation with community collaboration would be culturally insensitive and even extremely offensive.

12. Research Design Scenarios

Scenario 1

Most experimental group designs (e.g., classic experimental or Solomon four-group) would suffice given the scenario conditions. Refer to your readings and notes for symbols, procedures, and limitations to the specific group design you choose.

Scenario 2

A single-subject design (e.g., AB or ABAB) would suffice given the scenario conditions. Refer to your readings and notes for symbols, procedures, and limitations to the specific single-subject design you choose.

Scenario 3

Hoffman and Russo should use cross-sectional survey research. Refer to your readings and notes for procedures and limitations. A major strength is the design's ability to collect a huge amount of information at one point in time. A major limitation is the inability to provide evidence for causal relationships between variables because information is only collected at one point in time.

Scenario 4

Fonda and Hepburn should use longitudinal research. Refer to your readings and notes for procedures and limitations. A major strength is the design's ability to collect information over time. This will provide more evidence for causal relationships since they can assess changes at various periods. Major limitations include the huge amount of resources involved (time and money), and the potential attrition rate or mortality of the participants.

Triangulated, Mixed-Method Approach

Any of the research designs and methods to collect qualitative data would be helpful. What you must consider are the feasibility issues and ethical considerations involved with your mixed-methods design. For example, in Scenario 3, if Hoffman and Russo decide to conduct a phenomenology through face-to-face interviews with public health officials, they would collect rich and in-depth information about factors and themes related to those professionals and their job satisfaction. However, the cost of the time,

effort, and resources to conduct these interviews, and possible concerns for confidentiality and privacy, must be weighed against the benefit of this valuable qualitative data.

Try not to discard a quantitative or qualitative method altogether due to feasibility concerns or lack of experience and expertise in a particular method. Consider that one design can serve as the primary method (e.g., cross-sectional survey research or a case study via interviews with a relatively large sample) and a secondary method included for the sake of some triangulation (e.g., survey research with a simple questionnaire to measure demographics and basic levels of a characteristic or phenomena, or a small set of interviews with key informants, experts, or primary stakeholders). You will see that including even a modest amount of triangulation produces significant benefits in improving the breadth and depth of a study.

13. Qualitative Designs

Answers will vary.

14. Verification of Qualitative Data

Answers will vary. However, to give you an idea of some appropriate responses, let's look at the first scenario.

In terms of feasibility, Arkin might not be able to employ all these verification procedures, but in any case, using some is better than none.

To increase the integrity in analysis, after thematic assessment and interpretation has occurred, Arkin would generate and evaluate alternate conclusions to his findings in order to prevent the influence of preconceived notions and assumptions about families, family dynamics, and communication patterns that might prematurely narrow his conclusions.

Throughout the study, Arkin would implement design checks, regularly assessing his methods and data in the context of families and family dynamics within the focus of communication patterns and influence of having a family member with a psychological disorder.

Arkin could also use a peer review or debriefing as an external check, engaging social workers or other colleagues to monitor the integrity and progress of his research activities related to this study. For example, they could check his methodology, data collection, identification of themes, and fidelity of his interpretation.

Arkin, in using negative case analysis would examine his data and see if there is any contradictory information. He would then rework his interpretation to account for any opposing views, or at least report thoroughly how portions of his data are inconsistent with his main themes and explanations.

Since Arkin has personal and prior experience with disability, he should clarify potential researcher bias by explaining, at least to some degree, his background. This explanation would provide the reader with the researcher's position, bias, or assumptions that shape his interpretation and approach, which would at least signal his intention of objectivity or at least the context of the study for the sake of credibility.

Arkin could also conduct member checks, a process of both reflecting information back to the participants as it is gathered for sake of accuracy and clarification, and sharing results generated by the data to solicit the participants' views of the credibility of the findings and interpretations.

Arkin could also include rich and thick description. Detailed reports, accounts, and information would increase the generalizability of findings.

Arkin could employ external audits through using a consultant or auditor who are not connected to the project. The external auditor would examine the process and the product of the study.

If Arkin were to utilize observation, prolonged engagement and persistent observation would build trust with the participants, increase his understanding of the culture, and assess the accuracy of information. He would also need to evaluate if there are any influences in the data or interpretations due to the presence of the researcher himself. Prolonged engagement and persistent observation would work better in the Banderas dance therapy scenario since he is conducting an ethnography.

Arkin could also employ triangulation by either using multiple sources of information, or even adding a quantitative component to compliment the qualitative design.

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