LIGHTLY EDITED CART FILE

SKILL BUILDER SERIES - TEST OF MEAN DIFFERENCES

OCTOBER 29TH, 2016

WALDEN WEBINAR

10:00 A.M. - 10:30 A.M.

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Increased

>> TO LET EVERYBODY KNOW, THE SESSION WILL BE 2

RECORDED SO AT THE TOP OF THE HOUR I’LL TURN ON

THE RECORDING SO ANYTHING THAT’S GOING ON IN HERE

IN THE CHAT, YOU GUYS WILL BE ABLE TO SEE IN THE

RECORDING.

AS YOU SEE CLOSED CAPTIONING IS AVAILABLE.

WE HAVE A CAPTIONIST, THAT’S THE POD ABOVE THE

CHAT AREA.

WE DO ASK THAT YOU USE THE CHAT BOX TO ASK

QUESTIONS.

THAT WAY IT’S EASY FOR TO US TRACK IT.

YOUR MICS ARE MUTED AND THE REASON FOR THAT IS

BECAUSE WE HAVE A LOT OF PEOPLE ON AND THAT WAY

WE DON’T HAVE EVERYBODY TALKING OVER EACH OTHER,

AND THE RAISED HAND FEATURE, EVEN THOUGH IT IS

WORKING, WE DON’T USE IT.

SO JUST TYPE WHAT YOU NEED IN THE CHAT.

IF IT’S RELATED TO THE TOPIC AT HAND, ZIN WILL

TAKE YOUR QUESTIONS AT THE Q AND A TIME AT THE

END OF THE SESSION.

WE ALWAYS LEAVE ABOUT 10 MINUTES OR SO FOR Q AND
A.

IF IT'S ANYTHING REGARDING TUTORING IN GENERAL,

MY NAME IS KIM, I'M THE COORDINATOR OF THE

PROGRAM AND I CAN HELP YOU WITH THOSE KIND OF

QUESTIONS.

ANYTHING, ANY LINKS THAT I PRESENT TO YOU IN THE

CHAT ARE INTERACTIVE SO YOU CAN CLICK WHERE YOU

NEED TO GO.

IF YOU HAVE ANY QUESTIONS REGARDING THE SESSION,

THAT IT'S GOING TO BE -- WE HAVE A YOUTube

CHANNEL, IT WILL BE PUT ON THE YOUTube

CHANNEL AND I WILL POST EVERYTHING ON OUR

WEBSITE.

YOU CAN ALSO EVEN MAIL ME AT

ASCTUTORING@WALDENU.EDU.

AGAIN, THE PRESENTATION WILL BE AVAILABLE WITHIN

48 HOURS ON OUR WEBSITE.

IT'S THE ARCHIVED SKILL BUILDER WEBSITE AND

THAT'S ACTUALLY WHERE WE ARCHIVE ALL OF OUR

WEBINARS, SO THIS IS THE SIXTH SESSION OF A

SERIES THAT Dr. HTWAY HAS DONE, THIS IS MANOVA,

WHICH IS A PRETTY DIFFICULT TEST.

THIS IS THE END OF THAT SO WE HAVE PRIOR SESSIONS

THAT WE DID UP TO SIX ON THAT WEBSITE AND IF YOU
NEED THAT LINK AGAIN, ASK ME IN THE CHAT AND I’LL
BE HAPPY TO POP THAT IN THERE FOR EVERYONE.

SO WE’VE GOT ABOUT FOUR MINUTES UNTIL WE GO LIVE.

>> ZIN: WE NEED TO SCHEDULE FOR THE NEXT SET OF
SESSIONS.

[CONVERSATION] 4

>> WE’RE AT THE TOP OF THE HOUR.

I WANT TO WELCOME EVERYBODY AND GIVE A LITTLE
BACKGROUND ON ZIN.

IF YOU HAVEN’T JOINED US BEFORE, Dr. ZIN HOLDS
A Ph.D. IN PUBLIC HEALTH FROM WALDEN UNIVERSITY
AND AN MBA IN MANAGEMENT FROM WESTERN GOVERNOR'S
UNIVERSITY.

A BOARD-CERTIFIED TECHNOLOGIST AND WORKS
FULL-TIME AS SUPERVISOR AND -- AT LOWE’S HOSPITAL
IN THOUSANDS OAKS, CALIFORNIA.

HE’S ALSO FULL-TIME LECTURER AT THE CHANNEL
ISLANDS AND RECENTLY BECAME A CONTRIBUTING
FACULTY MEMBER AT WALDEN UNIVERSITY, TEACHING
ADVANCED BIOSTATISTICS.

Dr. HTWAY WORKS AT THE ACADEMIC SKILLS CENTER
AT WALDEN TUTORING STUDENTS IN RELATED
STATISTICS.
His research work is in -- Avian influenza detection and diabetes among Hispanic populations.

Welcome, Dr. HTway.

>> Thanks for that kind introduction, Kim.

For today's skill-builder webinar, I'm going to present one example of a research question using the GSS 2014 data set, and many of you should be familiar with that particular data set because it's released by Walden for statistical courses. With that data set, we'll have an explanation of the one-way MANOVA.

I'll mainly focus on the SPSS utilization and APA style writeup of a one-way MANOVA for doctoral research and for those of you who may be new to the test and means analysis, I suggest you take the time to strengthen your understanding of this family of statistical tests.

So, the one-way MANOVA, it's used to model two or more dependent variables that are continuous with one or more categorical predictor variables and that comes from our colleagues over at UCLA. It's in a sense very similar to the ANOVA where we have multiple groups and are measuring a
SINGLE DEPENDENT OUTCOME AND WE COULD BE MEASURING AGAINST THREE, FOUR, FIVE OR SIX GROUPS ALL IN THE SAME OUTCOME TO SEE IF THERE IS ANY DIFFERENCES.

WITH THE ONE-WAY MANOVA, WE IN ESSENCE HAVE -- WE CAN USE THE THREE, FOUR, FIVE GROUPS AND WE'RE ACTUALLY MEASURING TWO DEPENDENT VARIABLES.

AND THE REASON, OR THE LOGIC BEHIND DOING A MANOVA IS SIMILAR TO THE ANOVA, COMING FROM THE KEY TEST, WHICH IS REALLY OUR ORIGINAL TEST AND MEANS.

WITH THE T TEST WE HAVE TWO GROUPS AND ONE OUTCOME BUT IF WE WANT TO HAVE TWO, THREE, FOUR, FIVE, WE WOULD NOT WANT TO REPEAT THE T TEST FOR EACH AT THE TEST WE HAVE A 5% LEVEL OF PRECISION SO WE COULD GO FROM 5 TO 10 TO 15 TO 20% LEVEL OF PRECISION TO A POINT WHERE IT ACTUALLY IS NOT PRECISE ANYMORE, SO INSTEAD OF DOING MULTIPLE T TESTS, WE DO AN ANOVA WHICH IS A SINGLE TEST AND THAT GIVES US OUR -- THAT MAINTAINS OUR 5% LEVEL OF PRECISION.

THE MANOVA IS THE SAME, INSTEAD OF DOING MULTIPLE ANOVAS, WHERE WE WOULD DO, SAY, TWO SEPARATE
ANOVBEMBER AS, OUR LEVEL OF PRECISION WOULD INCREASE TO 10%, SO INSTEAD WE DO A MANOVA WHICH MAINTAINS THE LEVEL OF PRECISION.

SO THAT'S THE LOGIC BEHIND IT.

ESSENTIALLY A T TEST WHICH HAS BEEN MULTIPLIED ON TO ITSELF INTO A SINGLE STATISTICAL TEST.

FROM THE LAIRD STATISTICAL GROUP, THEY DESCRIBE IT AS A ONE-WAY MULTI-VARIABLE -- USED TO DETERMINE WHETHER THERE ARE ANY DIFFERENCES BETWEEN INDEPENDENT GROUPS ON MORE THAN ONE CONTINUOUS DEPENDENT VARIABLE, WHICH IS, YOU KNOW, SOMEWHAT SIMILAR, AND LASTLY, WE'VE GOT A MANOVA HAS TWO OR MORE INDEPENDENT VARIABLES AND TWO OR MORE DEPENDENT VARIABLES WHICH SEEMS PRETTY STRAIGHTFORWARD.

SO HERE ARE SOME EXAMPLES WHERE, YOU KNOW, IT WOULD BE APPROPRIATES TO USE A ONE-WAY MANOVBEMBER AWEVE HAD A RESEARCHER, WANTS TO KNOW IF ETHNIC BACKGROUNDS IS PROTECTOR OF YEARS OF SCHOOLING AND ALSO GPA.

SO WE'VE GOT OUR GROUPS WHICH ARE ETHNIC BACKGROUNDS AND YOU COULD HAVE THREE, FOUR, FIVE, SIX DIFFERENT ETHNICITIES AT YOUR -- THAT YOU'RE LOOKING INTO AND THEN OUR CONTINUOUS DEPENDENT
VARIABLES, WE HAVE YEARS OF SCHOOLING AND ALSO GPA, SO WE HAVE TWO SEPARATE DEPENDENT VARIABLES, BOTH ON A SCALE.

OUR NEXT EXAMPLE WOULD BE A RESEARCHER WANTS TO KNOW HIGH SCHOOL GRADUATION STATUS IS A PREDICTOR OF GLUCOSE LEVEL AND BLOOD PRESSURE.

SO WITH HIGH SCHOOL GRADUATION STATUS, YOU COULD HAVE GRADUATE, NON-GRADUATE, WE COULD ALSO HAVE A GRADUATE DIPLOMA, WHICH IS -- THE GRADUATE EQUIVALENT EXAM, SO WE COULD HAVE OUR THREE GROUPS AND THEN WE'RE TAKING A LOOK AT GLUCOSE LEVEL AND ALSO BLOOD PRESSURE, OUR TWO SCALED DEPENDENT VARIABLES.

AND LAST THING WE COULD LOOK AT, A RESEARCHER WANTS TO KNOW DISEASE STATUS IS A PREDICTOR OF STRESS AND HAPPINESS.

SO DISEASE STATUS MEANS THAT SOMEONE MAY HAVE THE DISEASE AND SOMEONE MAY NOT HAVE THE DISEASE AND THEN WE'RE LOOKING AT OUR MEASURES OF STRESS AND ALSO OF HAPPINESS WHICH WOULD BE TWO CONTINUOUS OR WE COULD DO IT ON A -- SCALE AND DETERMINE -- SEE IF THERE IS A RELATIONSHIP BETWEEN DISEASE STATUS.

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SO THOSE ARE JUST A COUPLE OF EXAMPLES.

NOW, THE STATISTICAL ASSUMPTIONS FOR ONE-WAY
MANOVA ARE QUITE EXTENSIVE AND SOME OF THEM ARE
REALLY QUITE OBVIOUS, BUT THE OTHERS ARE NOT SO
OBVIOUS.

IT'S REALLY BEYOND THE SCOPE OF TODAY'S SESSION
TO GO INTO THE GREAT DETAILS ABOUT HOW TO
ACTUALLY CHECK THE ASSUMPTIONS BUT JUST TO GO
THROUGH THEM REAL QUICKLY, SO WE START OFF WITH
WE HAVE TWO OR MORE DEPENDENT VARIABLES WHICH
WE'VE ALREADY SPOKEN ABOUT, MEASURED AT THE
INTERVAL OR RATIO LEVEL.

OUR INDEPENDENT VARIABLE SHOULD CONSIST OF TWO OR
MORE CATEGORY CALL INDEPENDENT GROUPS, JUST LIKE WE HAD ETHNICITY OR DISEASE STATUS.

YOU ALMOST ALWAYS WANT TO HAVE INDEPENDENCE OF
OBSERVATIONS, WHEN WE HAVE A TEST THE MEANS SO
THERE'S NO RELATIONSHIP BETWEEN THE OBSERVATIONS
UNLESS OF COURSE WE'RE DOING SOMETHING THAT'S
REPEATED OR PAIRED.

ALSO WANT TO HAVE FOR MANOVA, YOU WANT TO MAKE
SURE THAT YOU HAVE AN ADEQUATE SAMPLE SIZE AND
THIS IS VERY IMPORTANT.

WHEN YOU HAVE A SMALL SAMPLE SIZE, THE CONFIDENCE
INTERVALS TEND TO BE QUITE LARGE BUT BY INCREASING YOUR SAMPLE SIZE, THE CONFIDENCE INTERVALS WHICH IS REALLY A POPULATION ESTIMATE BECOMES MUCH MORE NARROW AND BEGINS TO TRULY REFLECT THE TRUE POPULATION ESTIMATE, AND SO IT'S IMPORTANT TO HAVE AN ADEQUATE SAMPLE SIZE FOR MANOVA AND OF COURSE IF YOU EVER NEED TO CALCULATE OUT SAMPLE SIZE, WE OFTEN RECOMMEND THE USE OF G-POWERED SOFTWARE AND WE HAVE A NUMBER OF TUTORIALS ON HOW TO USE THAT SOFTWARE, AND THEN WE GET INTO THE OUTLIERS AND FOR MANOVA JUST LIKE WE HAVE WITH OTHER TEST AND NEEDS TESTS, WE WANT TO MAKE SURE WE DON'T HAVE ANY OUTLIERS OR MULTI-VARIATE OUTLIERS HAVE THE THEY CAN SKEW YOUR DATA, EVEN THOUGH THEY'RE PROBABLY THE MOST INTERESTING DATA POINTS IN YOUR DATA SET, HAVING OUTLIERS CAN SKEW YOUR DATA SUBSTANTIALLY SO IT'S GOOD TO IDENTIFY THEM AND THEN MAYBE REMOVE THEM FROM THE CALCULATIONS FOR AT LEAST ONE CALCULATION AND THEN PUT THEM BACK TO SEE HOW IT AFFECTS YOUR CALCULATIONS. WE ALSO LOOK FOR MULTIVARIATE NORMALITY, THAT'S A PARAMETRIC TEST AND YOU WANT TO MAKE SURE THINGS
ARE PARAMETRICALLY OR DISTRIBUTED.

WE'RE ALSO LOOKING FOR THE LINEAR RELATIONSHIP BETWEEN EACH PAIR OF THE DEPENDENT VARIABILITIES, FOR EACH GROUP OF THE INDEPENDENT VARIABLES AND THAT CAN BE CHECKED WITH SCATTER PLOTS.

AND OF COURSE WE'RE ALSO LOOKING FOR THE HOMOGENEITY OF VARIANCE-COVARIANCE MATRICES.

THAT'S COMPLICATED TO TEST BUT I WOULD RECOMMEND SOME OF THE TEXTBOOKS AND -- ANDY FIELD HAS A GOOD SECTION IN HIS BOOK REGARDING THAT SUBJECT.

AND LASTLY, WE WANT TO MAKE SURE THERE'S NO MULTICOLLINEARITY.

THAT'S OFTEN SPOKE ABOUT IN MULTIPLE LINEAR REGRESSION WHERE YOU ACTUALLY HAVE THE VARIABLES THAT ARE SOMEWHAT RELATED TO EACH OTHER.

AND IT'S THE SAME FOR THE MANOVA, AS WELL, WHEN YOU HAVE VARIABLES RELATED TO EACH OTHER CLOSELY, IN ESSENCE, YOU'RE JUST DOUBLING UP ON A SINGLE VARIABLE AND SO IF THERE ARE IS MULTI-COLLINEARITY, PROBABLY SHOW A NON-STATISTICALLY RELEVANT RESULT. NOW, FOR THIS PARTICULAR SESSION, I JUST HAVE THE EXAMPLE, IS SEXUAL ORIENTATION A PREDICTOR OF EMAIL HOURS PER WEEK AND ALSO FAMILY INCOME?
I selected these variables from the GSS 2014 data set.

I just randomly selected those -- it wasn't random, I looked for sexual orientation which had multiple groups and then I sought out two independent -- I'm sorry, two dependent variables on a scale, one was email hours per week and also family income.

To run this in SPSS, we launch the SPSS and use the drop-down menu for Analyzer which we use for all tests.

We drop down to the General Linear Model and use the side menu for Multivariate.

Which opens up a new window, and we can see all of our variables here on the left-hand side.

The fixed factors, which is our groups, which is sexual orientation, we move that into the fixed factors box which is a box in the middle right and then we're going to move across to dependent variables.

One is the -- the first is email hours per week and then our second dependent variable is family income.
WE'RE GOING TO CLICK ON THE PLOTS, WE'RE GOING TO
MOVE SEXUAL ORIENTATION TO THE HORIZONTAL AXIS.
THIS IS GOING TO HELP US PRODUCE SOME PLOTS.
AND THEN WE'RE GOING TO CLICK ON THE "ADD" BUTTON
AND THAT'S IN THE MIDDLE OF THE SCREEN SO THAT
WILL ADD THE SEXUAL ORIENTATION TO THE PLOT
CHART.
THEN WE'LL JUST CLICK CONTINUE AND THAT WILL
RETURN US TO THE MAIN MULTIVARIATE SCREEN.
NOW WE WANT TO RUN A POST HOC AND THAT'S SIMILAR
TO THE HOST POLK WITH ANOVBEMER ATHE TESTS
THEMSELVES, ANOVA AND MANOVA, WILL TELL YOU
WHETHER OR NOT THERE IS A STATISTICALLY
SIGNIFICANT DIFFERENCE IN THE GROUPS IN
COMPARISON TO THE DEPENDENT VARIABLES BUT IT WILL
NOT IDENTIFY WHICH OF THE GROUPS ARE ACTUALLY
DIFFERENT FROM ALL OVER.
THAT'S WHERE WE RUN THE POST HOC TEST AND FOR
MAMONA, JUST LIKE ANOVBEMER A WE CAN USE THE TWO
KEYS SO WE'LL CLICK ON POST HOC, WHICH IS THE RADIO BUTTON.
I'M GOING TO MOVE ACROSS SEXUAL ORIENTATION TO
THE POST HOC TEST, AND THEN DOWN BELOW, I'M
GOING TO CLICK ON THE TUKEYS BUTTON AND THEN
CLICK ON CONTINUE.
AND NOW WE GO BACK AND CLICK ON THE OPTIONS RADIO
BUTTON FROM THE MULTIVARIATE WINDOW.
WE'RE GOING TO MOVE SEXUAL ORIENTATION, I WANT TO
SEE THE STATISTICS, SO WE MOVE THAT TO DISPLAIN
MEANS FOR AND THEN WE'LL CLICK ON THE CHECK BOXES
DOWN BELOW, DESCRIPTIVE STATISTICS, ESTIMATES OF
EFFECT SIZE AND KIM AND I WERE SPEAKING EARLIER,
WHEN IT COMES TO POWER ANALYSIS, IT'S GOOD TO
REPORT THE EFFECT SIZE AND ALSO WE WANT TO REPORT
THE OBSERVED POWER.
THIS IS ALL VERY IMPORTANT FOR THOSE OF YOU WHO
ARE IN DISSERTATION WHEN YOU DO YOUR DATA
ANALYSIS IN CHAPTER 4 TO PRESENT THE EFFECT SIZE
OF THE ANALYSIS AND ALSO THE OBSERVED POWER OF
THE ANALYSIS.
THEN WE'LL JUST CLICK CONTINUE, AND THEN WE'RE
GOING TO CLICK THE "OKAY" BUTTON FOR OUR OUTPUT
AND AS ALWAYS, SPSS PUTS OUT LOTS OF TABLES.
THE FIRST TABLE I WANT TO BRING TO YOUR ATTENTION
IS THE DESCRIPTIVE STATISTICS TABLE AND WE CAN
SEE THAT FOR WHEN WE LOOK AT SEXUAL ORIENTATION,
WE'VE GOT THREE GROUPS, GAY, LESBIAN OR
HOMOSEXUAL HAVE THE THEN WE HAVE BISEXUAL AND THEN WE HAVE OUR THIRD GROUP IS HETEROSEXUAL OR STRAIGHT, AND THEN WE SHOW OUR TOTAL, SO WHEN WE LOOK AT EMAIL HOURS PER WEEK, WE CAN SEE THAT FOR GAY, LESBIAN, HOMOSEXUAL, THERE IS A MEAN OF .96 AND IF YOU'RE BISEXUAL, 4.1, AND IF YOU'RE HETEROSEXUAL OR STRAIGHT, IT'S 6.43 WITH A TOTAL AVERAGE MEAN OF 6.41 AND WE CAN SEE OUR STANDARD DEVIATIONS FOR EACH OF THE GROUPS IN THE NEXT COLUMN AND THEN WE CAN ACTUALLY -- WE SEE IN THE LAST COLUMN THE SAMPLE SIZE FOR EACH GROUP, SO IF WE LOOK AT TOTAL, WE'LL SEE THAT FROM THE GSS 2014 DATA SET, WE HAVE 1273 PARTICIPANTS IN OUR SAMPLE SIZE BUT THEN WE'VE GOT, FOR GAY, LESBIAN, HOMOSEXUAL, THERE'S 25 AND THEN FOR BISEXUAL, IT'S 42.

AND IF WE LOOK AT THE NEXT ROCKS WHICH IS THE FAMILY INCOME, WE HAVE THE SAME THREE GROUPS AND WE CAN TAKE A LOOK AT THE MEANS WHERE GAY, LESBIAN, HOMOSEXUAL IS AT 34,000, AND THIS IS, YOU KNOW, THESE REPRESENT ANNUAL INCOME, SO IT'S IN DOLLARS. FOR BISEXUAL, WE HAVE 19,677 AND FOR HETEROSEXUAL OR STRAIGHT, WE HAVE ABOUT 35,987.
SO -- AND THEN OF COURSE WE HAVE THE
CORRESPONDING STANDARD DEVIATIONS AND THEN OUR
SAMPLE SIZES AGAIN.
LOOKING AT THESE -- AT THE DESCRIPTIVE
STATISTICS, WE CAN SOMEWHAT IDENTIFY THAT GAY,
LESBIAN, HOMOSEXUAL DO NOT VARY SO MUCH FROM THE
HETEROSEXUAL OR STRAIGHT FOR BOTH EMAIL HOURS
AND ALSO FAMILY INCOME BUT THE BISEXUAL GROUP IS
ACTUALLY NOTABLY LOWER.
AS WE MOVE ON TO THE NEXT TABLE, WE'RE GOING TO
LOOK AT THE MULTIVARIATE TESTS, AND WE'RE GOING
TO FOCUS ON THE WILKES LAMBDA.
SPSS PUTS OUT A LOT OF DIFFERENT COMBINATIONS BUT
FOR THIS WE'LL LOOK AT THE WILKES LAMDA.
I'VE HIGHLIGHTED IN YELLOW, YOU CAN SEE THE -- WE
HAVE THE VALUE AT .991 AND IF WE GO ACROSS TO THE
SIG, WE REPRESENTS OUR P VALUE, WE'LL SEE THAT
OUR SIG VALUE IS .026 SO IT IS LESS THAN THE .05.
SO WE KNOW WE HAVE A STATISTICALLY SIGNIFICANT
RESULT OR FINDING BY RUNNING OUR MANOVA.
WE HAVE THE PARTIAL A SQUARED WHICH IS THE A
PORTION OF THE EFFECT SIZE AND IF WE GO TO THE
LAST COLUMN, WE HAVE OUR OBSERVED POWER WHICH IS
.765, so it is a little bit less than will .80

That we're used to working with for power but

that's just what came out of this particular

example.

The next table we look at is the test of between

subjects effects and here we can see we've got

sexual orientation and highlighted in yellow

again and we can look at -- we've got email hours

per week, and we can see that email hours per

week, if we go across to the sig value, once

again, we see that that it's .259, so for email

hours, there's really no significant difference

amongst the email hours per week.

However, but for family income, if we look just

below the sig value at .010 is a significant

difference and then once again, we've got our

partial a to squared, which is our effect size

for each, each group and then we can look at our

observed power again.

Our next table, we've got -- this is our post

hock, our multiple comparisons and this is where

we figure out where there is a difference between

which groups, bus it's a bit more detail and
EMAIL HOURS PER WEEK, THERE WAS NO SIGNIFICANT --
TO TIS PARTICULARLY SIGNIFICANT DIFFERENCE.
IF WE LOOK AT ALL THE COMBINATIONS UNDER SIG, THEY'RE WILL MUCH GREATER THAN .05.
HOWEVER, FOR FAMILY INCOME, WE SEE THE BISEXUAL GROUP COMPARED AGAINST HETEROSEXUAL OR STRAIGHT,
IT IS SIGNIFICANT AT .007 SO WE CAN SAY THERE IS A DIFFERENCE BETWEEN FAMILY INCOME OF THE BISEXUAL GROUP COMPARED TO THE HETEROSEXUAL OR STRAIGHT.
BUT NOTICE THAT THERE'S -- THE COMPARISON BETWEEN BISEXUAL AND GAY LESBIAN OR HOMOSEXUAL IS NOT STATISTICALLY SIGNIFICANT, THAT'S .220 SO THIS IS ONE OF THE REASONS WHY WE RUN -- THE MOST-- MOST IMPORTANT REASON WE RUN THE POST-HOCK, MULTIPLE COMPARISONS SO WE CAN SEE WHERE THE DIFFERENCES ACTUALLY ARE.
AND IF WE LOOK UNDER -- IF WE LOOK AT FAMILY INCOME WHERE IT SAYS BISEXUAL AND BELOW IT WHERE WE SEE HETEROSEXUAL OR STRAIGHT, SINCE THE POST HOCK RUNS THE SAME COMPARSES SONS, JUST WITH THE THREE GROUPS, THAT'S WHAT WE HAVE SIX DIFFERENT COMBINATIONS HERE, WE CAN ACTUALLY SEE THAT HETEROSEXUAL COMPARED TO BISEXUAL, THE SIG VALUE
IS .007 WHICH IS THE SAME AS WHAT WE HAVE COMPARING BISEXUAL TO HETEROSEXUAL OR STRAIGHT.

WE JUST HIGHLIGHT IT IN YELLOW SO THERE'S NO DIFFERENCE THERE.

ALL RIGHT, SO FOR THE PLOTS, BECAUSE THIS IS WHY WE RAN THE PLOTS SO WE CAN SEE A BIT BETTER OR WITH BETTER CLARITY, WE CAN SEE THAT FOR EMAIL HOURS PER WEEK, WE CAN SEE THAT THE BISEXUAL GROUP IS QUITE A BIT LOWER THAN THE HETEROSEXUAL OR STRAIGHT GROUP, AND THEN REGARDING FAMILY INCOME, WE SEE SOMETHING VERY SIMILAR, AS WELL.

GAY, LESBIAN OR HOMOSEXUAL, AND HETEROSEXUAL OR STRAIGHT ARE UP AROUND 35,000 ANNUALLY WHERE THE BISEXUAL GROUP IS AROUND 20,000.

AND THAT'S A REFLECTION OF OUR DESCRIPTIVE STATISTICS TABLE WHICH I JUST WANTED TO SHOW AGAIN SO YOU CAN ALL SEE THAT.

SO GETTING TO THE APA STYLE WRITE-UP FOR MANOVA. THIS IS JUST A BRIEF TEMPLATE JUST TO SHOW SOME OF THE INFORMATION THAT YOU WOULD WANT TO INCLUDE, TO INVESTIGATE THE RESEARCH QUESTION, IS SEXUAL ORIENTATION A PREDICTOR OF EMAIL HOURS FEAR WEEK AND ALSO FAMILY INCOME, A ONE-WAY
A multiple analysis of variance was conducted. The analysis showed a statistically significant difference in email hours per week and family income based on sexual orientation, where we have our N value of 4, 2538 equaling 2.77. P less than .05, the Wilk's Lambda equals .991...

[Reading from the screen]

Therefore, the null hypothesis is rejected and the alternative hypothesis is retained.

So, of course, when you write up your results for your MANOVA, you go ahead and plug in the numbers but you have to go back and read it to make sure it does make sense and you may want to expand in presenting other statistical findings which may be important to your particular research question.

So, at this point in time, I would like to take some questions.

If you would please put those into the chat box there.

>> ZIN, THERE WAS A FEW QUESTIONS EARLIER.

Sorry, I have a little cold.
THE FIRST QUESTION, IF YOU SCROLL UP ON THE CHAT, THERE WAS A QUESTION FROM DENISE AND THEN LOU ANNA.

DENISE HAD ASKED WHY IS THE MEAN USED VERSUS AVERAGE, YOU KNOW, THE TERMINOLOGY, AND THEN LUANNA HAD ASKED A QUESTION ABOUT MANOVA AND THE VARIABLES.

SO CAN YOU SEE THAT, IF YOU SCROLL BACK A LITTLE BIT?

>> LET ME SEE, MAYBE I WENT TOO FAR, I THINK. FIRST ONE WAS FROM DENISE?

>> DENISE HAD ASKED WHY IS THE MEAN USED VERSUS AVERAGE.

>> THEY'RE ABOUT THE SAME.

I PUT THEM IN THE PRESENTER AREA, AS WELL.

SOMETIMES IT'S HARD TO SCROLL BACK.

>> I NEED A LARGER MONITOR AT MY END.

OKAY, SO WHY IS MEAN USED VERSUS AVERAGE?

THE MEAN IS OUR NORMAL STATISTICAL TERM THAT WE USE.

MEAN AND AVERAGE ARE ACTUALLY ARE ABOUT THE SAME IN TERMS OF THE ACTUAL NUMBER, WE JUST USE THE
TERMINOLOGY "MEAN" INSTEAD OF AVERAGE.

WHY, I'M NOT REALLY SURE, IT'S JUST PART OF PART
OF THE VERNACULAR OF STATISTICS.

NOT A GREAT ANSWER BUT JUST SORT OF IS THAT WAY.

AND THE SECOND QUESTION, SO WITH A MANOVA, YOU
CAN USE AN INDEPENDENT VARIABLE THAT HAS MULTIPLE
CATEGORICAL VALUES.

YOU DON'T ACTUALLY HAVE TO HAVE TWO OR MORE
INDEPENDENT VARIABLES.

THE INDEPENDENT VARIABLES ARE THE GROUPS.

WITH A TEST IN MEANS, YOU ALWAYS HAVE GROUPS.

FOR MANOVA, YOU WOULD HAVE TWO OR MORE GROUPS, IN

THIS EXAMPLE, WE HAVE THREE GROUPS AND THEN THE
DEPENDENT VARIABLES, WHICH IS ACTUALLY WHAT WE'RE
ACTUALLY MEASURING AND THAT'S ON A SCALE SO YOU
COULD HAVE MULTIPLE CATEGORICAL VALUES FOR YOUR
GROUPS, OF COURSE.

I'M NOT SURE IF THAT ANSWER ATTENTION YOUR
QUESTION.

>> ALSO A QUESTION BY LUANNA ABOUT G-POWER
SOFTWARE, ZIN, AND IF THERE IS A -- PART OF THE
SPSS OR A DIFFERENT PACKAGE

>> THE G-POWER SOFTWARE IS A SEPARATE PACKAGE.

IT'S ACTUALLY -- IT'S COMPLETELY SPATE FROM SPSS.
G-POWER SOFTWARE IS A FREE DOWNLOAD AND INSTalls

VERY QUICKLY AND IT IS ACTUALLY QUITE EASY TO

USE.

THE NICE THING ABOUT G-POWER SOFTWARE FOR POWER

ANALYSIS, THERE ARE FOUR VARIABLES.

YOU'VE GOT YOUR ALPHA, WHICH IS YOUR PRECISION,

WHICH IS FOR US MOST TIMES WE GOT .05 BECAUSE ARE

THE POINTS TO 95% CONFIDENCE IN THE INTERVAL.

WE HAVE POWER, WHICH MOST TIMES WE USE .08, 80%

POWER, WHICH IS A REFLECTION OF THE POWER TO

DETECT A STATISTALLY SIGNIFICANT RESULT.

THAT'S ACTUALLY WHAT THE POWER STANDS FOR, AND

THEN WE ALSO HAVE THE EFFECT SIZE, AND THE EFFECT

SIZE IS REALLY A -- IT'S A COEFFICIENT WHICH

REPRESENTS THE DIFFERENCE BETWEEN -- THE

DIFFERENCE THAT YOU'RE LOOKING FOR, AND THEN

LASTLY WE HAVE SAMPLE SIZE AND FOR EVERY

STATISTICAL TEST, THOSE FOUR VARIABLES, YOUR

ALPHA, YOUR POWER, YOUR EFFECT SIZE AND SAMPLE

SIZE, THEY HAVE MATH EQUATIONS

WHICH EQUAL ONE, AND SO IF YOU KNOW THREE OF THE

FOUR, YOU CAN CALCULATE THE FOURTH ONE, AND

THAT'S WHAT G-POWER DOES FOR YOU.
FOR DISSERTATION STUDENTS WHO ARE IN THEIR
PROPOSAL STAGE, GETTING THEIR CHAPTER 3 THAT NEED
TO PRESENT THE MINIMUM SAMPLE SIZE, YOU WOULD USE
G-POWER TO CALCULATE THE MINIMUM SAMPLE SIZE
NEEDED FOR YOUR STUDY, AND THAT WOULD BE AN
APIORE CALCULATION.
AFTER YOU CLICK ALL YOUR DATA, EXCUSE ME, YOU
WOULD DO A POST -- TO SEE SO MY SAMPLE SIZE WAS
395 OVER MY FIVE GROUPS.
YOU WOULD CALCULATE OUT WHAT WAS MY ACHIEVED
POWER, WHAT WAS MY ACHIEVED EFFECT SIZE, AND SO
THAT'S WHAT'S REALLY NICE ABOUT G-POWER AND IT IS
QUITE EASY TO USE.
FAR EASIER TO USE THAN, ACTUALLY, SPSS, AND WE
HAVE A NUMBER OF TUTORIALS ON HOW TO USE G-POWER
SO,...

>> AND, YOU KNOW, ZIN, DENISE WROTE THAT SHE HAD
MEANT TO ASK ABOUT THE MEDIAN, NOT THE...

>> OH, OH, OKAY.

THE FOR THE TEST OF MEANS, IT'S ACTUALLY THE
MEAN.
THE MEDIAN VALUE IS PART OF YOUR DESCRIPTOR
STATISTICS AND, HONESTLY, I CAN'T THINK OF ANY
STATISTICAL TEST WHICH CALCULATES THE MEDIAN.

THE MEDIAN IS A VALUE FOR WHICH IS IN THE MIDDLE WHERE YOU HAVE 50% OF YOUR DATA POINTS ON THE LEFT AND 50% OF YOUR DATA POINTS ON THE RIGHT.

NOT NECESSARILY THE MEAN VALUE.

WE USE MEDIAN JUST PRETTY MUCH TO SHOW WHAT THE DISTRIBUTION OF DATA POINTS ACTUALLY ARE, AND IT'S REALLY QUIET COMMON FOR REAL ESTATE SALES AND SUCH BUT THE MEDIAN -- EARLIER WHEN I HAD DISCUSSED ABOUT HOW OUTLIERS CAN SKEW YOUR DATA, THE OUTLIERS WILL SKEW YOUR DATA IF YOU LOOK AT IT WITH MEDIAN VALUES COMPARED TO THE -- THERE WILL BE QUITE A BIT DIFFERENT THERE.

>> DENISE ALSO ASKED ABOUT G-POWER APPLICATION, WHICH I THINK THAT'S A LITTLE LOADED FOR THIS WEBINAR BUT…

[Laughter]

>> OH, OKAY, IT'S ALL RIGHT.

THE G-POWER, HOW DO YOU DETERMINE THE TEST FAMILY STATISTICAL TEST, AND TO DETERMINE WHAT STATISTICAL TEST YOU'RE GOING TO RUN, YOU HAVE TO
START WITH YOUR RESEARCH QUESTION, AND THEN YOUR VARIABLES, AND THEN FROM THERE -- I KNOW THE LOADED ANSWER WOULD BE, YEAH, SET UP A TUTORING SESSION WITH ACADEMIC SKILLS CENTER TUTOR AND WE'LL HELP YOU BUT IF YOU LOOK AT THE ASSUMPTIONS OF EACH OF THE TESTS AND AS YOU GET MORE AND MORE FAMILIAR WITH STATISTICAL TESTS, YOU'LL UNDERSTAND WHICH STATISTICAL TEST TO ACTUALLY RUN TO ANSWER YOUR RESEARCH QUESTION. YOU MAY BE RUNNING A SIMPLE LINEAR REGRESSION OR MAY BE DOING A T-TEST, OR FENDING UPON -- I TRY TO TELL STUDENTS THAT, YOU KNOW, FOCUS ON YOUR DEPENDENT VARIABLE. WHAT IS IT THAT YOU'RE ACTUALLY MEASURING BECAUSE THAT WILL LEAD YOU TO THE CORRECT FAMILY OF STATISTICAL TESTS. IF YOU'RE LOOKING FOR A DICHTOMOUS OUTCOME, IF SOMEBODY HAS A DISEASE OR NO DISEASE, RIGHT? THEN YOU'RE GOING TO BE IN THE LOGISTIC ANALYSIS, SOME TYPE OF LOGISTIC REGRESSION AND THEN TO DETERMINE WHICH REGRESSION, YOU GO AND LOOK AT YOUR INDEPENDENT VARIABLES. BUT ONCE YOU FIGURE OUT WHAT YOUR STATISTICAL TEST IS GOING TO BE, THEN YOU CAN FIGURE THAT OUT
IN G-POWER WHICH OF THE STATISTICAL TESTS

ACTUALLY TO PLUG IN, SO...

>> GO AHEAD, ZIN, I'M SORRY

>>

>> I NOTICED YOU CHANGED THE SLIDE --

>> YEAH, BECAUSE THERE WAS -- DENISE -- I ASKED

DENISE IF SHE WAS IN DISSERTATION BECAUSE I

THOUGHT SHE COULD GET A TUTORING APPOINTMENT BUT

SHE SAID SHE'S FINISHING UP HER COURSE WORK SO I

WANTED TO GIVE HER THE YOUTube CHANNEL LINK

SO SHE CAN GO TO WATCH YOUR VIDEOS.

>> OKAY, GREAT.

>> WE HAVE TWO MINUTES LEFT AND I JUST WANTED TO

GIVE EVERYBODY A CHANCE TO SEE -- EXCUSE ME

VOICE, LOSING MY VOICE. 26

IF IF YOU WANT TO REACH MYSELF, I'M THE

COORDINATOR OF THE PROGRAM AT

ASCWALDENTUTORING@WALDENU.EDU.

THE YOUTube CHANNEL IS A GREAT PLACE TO GO,

ALL THE WEBINARS AND TUTORIALS, GOING BACK TO

2015, PROBABLY S GOING TO BE ON THE YOUTube

CHANNEL SO THAT LINK IS RIGHT THERE ON THE SLIDE.
AND ALSO PLEASE CHECK OUT OUR WEBSITE FOR TUTORIALS AND OUR UPCOMING EVENTS.

IF YOU WOULD LIKE MORE INFORMATION, WE HAD SOME QUESTIONS ABOUT TUTORING.

I DID PUT THE LINK IN FOR WC ON LINE, WE ALSO HAVE CANDICE ONLINE.

>> WONDERFUL, HI CANDACE.

>> SHE WAS ALSO HELPING OUTS IN THE CHAT TO HELP WITH GETTING APPOINTMENTS AND HELP WITH TUTORING.

>> GREAT, IN FACT, I HAVE A TUTORING APPOINTMENT RIGHT NOW.

>> SO WE'LL START CLOSING OUT -- IF ANYBODY HAS ANY MORE, WE HAVE TIME FOR ANOTHER QUICK QUESTION AND THEN ZIN HAS TO SCOOT FOR TUTORING.

>> I THINK WE'RE...

>> ALL RIGHT.

WELL, IT'S 11:30, I'M GOING TO STOP THE RECORDING.

>> I MIGHT NEED TO HOP OVER TO WC ONLINE, I HAVE SOMEBODY WAITING FOR ME.

>> GO AHEAD, I'LL SEE YOU...
> THOSE SO MUCH, EVERYBODY.
THANKS, KIM, THANKS, CANDICE.

HAVE A GREAT DAY.

BYE-BYE NOW.

> BYE, ZIN.

> THANK YOU, EVERYONE.

BYE, CANDACE, THANK YOU.

CANDACE IS ONE OF OUR TUTORS, YOU CAN GET TO
CANDACE ON OUR NON-DISSERTATION SCHEDULE.

OUR SCHEDULES ARE BROKEN DOWN BY DISSERTATION,
NON-DISSECTORATION AND WORD.

WE ALSO HAVE MS OFFICE.

I DIDN'T HAVE A CHANCE TO TALK ABOUT

DISSERTATION, I WANTED TO GIVE ZIN ENOUGH TIME TO

GET TO YOUR QUESTIONS BUT WCONLINE IS OUR

TUTORING PLATFORM THAT WE USE AND I KNOW LENELL
YOU HAD ASKED A FEW QUESTIONS, THE LINK YOU PUT

IN EARLIER, I'LL POP IN IT AGAIN FOR YOU GUYS

SINCE I'M HERE.

SO HERE YOU GO.

THIS IS WY ONLINE, YOU CAN GO IN AND REGISTER FOR
A TUTOR AND YOU NEED TO FILL OUT A FORM USING YOUR WALDEN STUDENT EMAIL AND CREATE A PASSWORD. A COUPLE OF SECONDS AND ACCESS THE SCHEDULES. THERE YOU GO, LENNELL. AND THEY'RE BROKEN DOWN SO ZIN IS ACTUALLY A DISSERTATION TUTOR, HE DOES TUTORING FOR STUDENTS THAT ARE IN CHAPTER 4, I BELIEVE. THEY'VE DONE THEIR RESEARCH DESIGN AND ALL THAT AND RUN THEIR DATA, THEY'RE KIND OF LOOKING FOR SOME SUPPORT. HE CAN'T RUN DATA FOR YOU OR ANYTHING BUT HE CAN CERTAINLY HELP YOU UNDERSTAND THE DATA CONCEPTS, THAT KIND OF THING. FEEL FREE TO EMAIL -- THIS IS OUR SUPPORT EMAIL, A SPECIALIZED ROLL ACCOUNT AND THAT IS HOW TO REACH STATS TUTOR. Dr. HTWAY IS ACTIVE IN THAT ACCOUNT AND SO IS CANDACE, THEY'RE VERY ACTIVE IN STAT SUPPORT. IF YOU CANNOT GET AN APPOINTMENT AND YOU NEED TO RUN SOMETHING BY A TUTOR, EMAIL THAT ACCOUNTS AND THEY RESPONDS USUALLY WITHIN 24 HOURS DURING THE WEEK AND 48 HOURS OVER THE WEEKEND, AND THEY'LL GETS BACK TO YOU RIGHT AWAY AND YOU CAN ALSO WORK THROUGH EMAIL.
I’LL HAVE THIS WEBINAR UP IN A COUPLE OF DAYS.
IF YOU HAVE ANY QUESTIONS ABOUT THE RECORDING,
YOU CAN EMAIL ME AT ASCTUTORING@WALDENU.EDU.
I’M KIM, THE COORDINATOR OF THE SERVICES PROGRAM.
SORRY, I HAVE A HARD TIME TYPING AND TALKING AT
THE SAME TIME.
REALLY APPRECIATE YOU GUYS COMING AND BEING WITH
US THIS MORNING.
YOU’RE WELCOME, LUANNA.
ALSO, I WANT TO LET EVERYBODY KNOW THAT SARAH,
ONE OF OUR INSTRUCTIONAL SUPPORT SPECIALISTS, WE
ARE PILOTING LIVE DROP-IN SESSIONS FOR STATISTICS
FOR NON-DISSERTATION, SO IF YOU’RE IN
QUANTITATIVE REGION ANALYSIS OR ADVANCED
QUANTITATIVE OR TAKING STATS IN ANOTHER COURSE,
YOU CAN POP IN, IT’S EVERY SATURDAY MORNING AT
10:00 a.m., FROM 10:00 TO 11:00 EASTERN TIME.
ALSO IN CONNECT LIKE WHERE YOU ARE NOW, AND SARAH
IS IN THERE AND SHE’LL JUST HELP YOU OUT WITH
ANYTHING THAT YOU NEED.
WE WANTED TO EXPAND OUR TUTORING BECAUSE WE KNOW
THE NON-DISSERTATION SCHEDULE IS BOOKED VERY
QUICKLY SO WE WANTED TO GIVE YOU GUYS ANOTHER
OPTION SO IF YOU WOULD LIKE THE LINK FOR THE
SESSION, EMAIL ME AT THAT ASC TUTORING EMAIL
ADDRESS AND I CAN GET YOU THE LINK AND LIKE I
SAID, THEY RUN EVERY SATURDAY MORNING.
YOU DON'T HAVE TO STAY THE FULL HOUR, YOU CAN GET
WHAT YOU NEED AND LEAVE, THAT'S FINE, BUT I
WANTED TO GIVE YOU GUYS THAT OPTION.
WE'RE AT 11:35, SO I'M GOING TO LET THE CAPTIONER
GO AND I'M GOING TO END THE SESSION.
AGAIN, THANK YOU SO MUCH, EVERYONE.
WE REALLY APPRECIATE IT.
WE'RE SO GLAD TO BE HELPFUL.
HAVE A GREAT SATURDAY, EVERYBODY.

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