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Hypothesis testing in spss pdf

This tutorial, which uses SPSS for T-tests, shows how to use SPSS version 12.0 to perform a single sample t-test, an independent sample t-test, and a pair-sample t-test. In this tutorial, you downloaded a standard class dataset (click the link to save the data file) and start SPSS (click Start) program . . . . SPSS 12.0 for Windows) One sample t-test You can use one sample t-test to determine whether the mean of a sample is different from a specific value. This example determines whether the average number of older siblings a student in PSY 216 has is greater than 1. We follow conventional steps: first write nulls and alternative hypotheses: H0:mu216 students≤1 H1:mu216 students > 1 μ is the average number of older siblings that PSY 216 students have. Check to see if this is a single-tail test or a two-sided test. This must be a one-sided test because the hypothesis contains the phrase greater than. α level: α the appropriate statistical test. Because the older variable is the ratio scale, the Z-score test or the t-test may be appropriate. The z-test is incorrect because the population standard deviation is unknown. Use the t-test instead. Calculate the t-value or let SPSS do it for you! Then click the arrow button to move the variable to the Test Variables pane. This example moves the old variable (the number of old siblings) to the <a0> Test variable </a0> box. In this example, to compare whether the number of older siblings is greater than 1, type 1 in the Test value box. The Output Viewer is displayed. There are two parts to the output. The first part provides statistics for the description of the variable that you moved to the <a0> Test Variables </a0> box of the <a1> 1 Sample t Test </a1> dialog box. This example retrieves descriptive statistics for the old variable: this output shows 46 observations (N), an average number of siblings of 1.26, and a standard deviation of 1.255 for the number of old siblings. The standard error of the mean (standard deviation of the sampling distribution of the mean) is 0.185 (1.255/square root 46 x 0.185). The second part of the output shows the value of the statistical test.The output column shows that the degree of freedom for this t-test is 45 degrees (46 - 1 x 45) / (the square root of 1.255 / 46) is 1.410 (when the calculation is performed, the values do not exactly match due to rounding errors). The fourth column shows the significance of both sides (two-tail p-value). But we didn't want a test on both sides. Our hypothesis is one tail, and there is no option to specify a one-tail test. Since this is a single-hem test, examine the table of critical t-values to determine the critical t. A critical t-α 45 degrees of freedom is .05 and one side is 1.679. Determines whether the null hypothesis can be rejected. The decision rule can reject H0 if the critical t-value on one side is less than the observed t and the mean is in the correct order. In this example, H0 cannot be rejected because critical t is 1.679 (from a table of critical t-values) and observed t is 1.410. That is, there is not enough evidence to conclude that the average number of older siblings in the PSY 216 class is greater than 1. If we were writing this to publish in the APA journal, the t-test could not reveal a statistically reliable difference between the average number of older siblings that the PSY 216 class has (M : 1.26, s - 1.26) and 1, t (45) - 1.410, p<.05, α - .05. Independent sample t-test If two samples are involved in a single-value group, the samples can be obtained from different individuals that do not match (the samples are independent of each other). Alternatively, samples can come from the same individual (samples are against each other), and samples are not independent of each other. The third option is that the sample can come from different individuals who match the variables of interest. This type of sample is not independent. The format of the t-test is slightly different from the independent sample and dependent sample type of the two sample tests, SPSS has a separate procedure for performing two types of tests. The independent sample t-test can be used to determine whether two averages are different from each other when the two samples on which the mean is based are taken from different individuals that do not match. This example determines whether students in sections 1 and 2 of PSY 216 have different numbers of older siblings. We follow our conventional procedure: first write a null and an alternative hypothesis: H0: .muSection 1 , muSection 2 H1: .muSection 1 ≠ .muSection 2 μ is the average number of old siblings that PSY 216 students have. Check to see if this is a single-tail test or a two-sided test. This must be a two-tail test because the hypothesis contains the phrase different and does not specify an average order. α level: α - .05 Appropriate decisionTest. Because the older variable is the ratio scale, the Z-score test or the t-test may be appropriate. The z-test is incorrect because the population standard deviation is unknown. In addition, sections 1 and 2 of PSY 216 have different students and do not match. For these factors, use an independent sample t-test. Calculate the t-value or let SPSS do it for you! The Independent Sample t Test dialog box is displayed. Then click the up arrow button to move the variable to the Test Variables pane. This example moves the old variable (the number of old siblings) to the <a0> Test variable </a0> box. Then click the down arrow button to move the variable in the Grouping Variables box. This example moves a section variable to the grouping variable box: YOU need to tell SPSS how to define the two groups. Click the Define Group button. The <a0> Define Group </a0> dialog box appears: In the <a1> Group1 </a1> text box, type the value that determines the first group. In this example, the value of the section at 10:00 A.M. is 10. In the Group 1 text box, type 10. In the Group 2 text box, type the value that determines the second group. In this example, the value of the section at 11:00 A.M. is 11. In the Group 2 text box, type 11. To run the t-test, click the OK button in the Independent Sample t-Test dialog box. The output viewer is displayed with the results of the t-test. There are two main parts of the result: descriptive statistics and confidential statistics. First, descriptive statistics: Shows descriptive statistics (defined by grouping variables) for the two groups. In this example, there are 14 people in section (N) at 10:00 A.M., with an average of 0.86 years older siblings and a standard deviation of 1.027 years older siblings. There are 32 people in section (N) at 11 a.m., with an average of 1.44 siblings and a standard deviation of 1.318. The last column shows the standard error of the mean for each of the two groups. The second part of the output shows the estimated statistic: the column labeled Test for Equality of Legend Variance isThe t-test has been met. The t-test assumes that the variability of each group is about the same. If that assumption is not met, you must use a special form of t-test. Look at the column labeled Sig. under the heading Isoness Test for Leven Variance. In this example, the significance (p-value) of The Levene test is .203. If this value is below α level of the test (usually .05), you can reject the null hypothesis that the variation of the two groups is equal. If the p α level or lower, you must use the line below the output (the line labeled Equal variance is not expected). If the p α is greater than the same level, you must use the central line of output (the row labeled Row with Equal Variance). In this example, .203 is greater than α, so assume that the variances are equal and use the middle line of the output. A column labeled t indicates an observation or a calculated t-value. In this example, assuming equal variance, the t-value is 1.461. (The two-tailed t-test can ignore the sign of t.) The column labeled df indicates the degrees of freedom associated with the t-test. In this example, there are 44 degrees of freedom. A column labeled Sig. (2 tails) indicates the p-values on both sides associated with the test. In this example, the p-value is .151. If this is one of the tests, check the critical t in the table. Determines whether H0 can be rejected: As before, the decision rule is specified in the following ways: ≤ α reject H0 if p is the case. In this example, H0 cannot be rejected because .151 is not less than or less than .05. This means that the difference in the number of old siblings between the two sections of this class could not be observed. If you were writing this to be published in the APA journal, the t-test has the average number of older siblings that the 10 a.m. section has (M x 0.86, s The average difference between 1.44, s is 1.318), t(44) is 1.461, p is .151, α is 05 could not be clarified. You may want to run the independent sample t-Test cutpoint group t-test, but the group is defined by a variable that is not binary (that is, it has two or more values). For example, students with more GPAs may not have lower GPAs. Since there is no single value that specifies a GPA value of High or Low, it is not possible to proceed as accurately as before. Before you continue, determine the values that you want to use to divide the GPA into upper and lower groups. The median is good because half of the score is above the median and half is below. (If you don't remember how the median is calculated, see the frequency command in the description.)This is a tutorial. First write a null and an alternative hypothesis: H0:[mulower GPA] - [muhigher GPA H1: [mu] lower GPA ≠ μ higher GPA psY 216 students have the average number of older μ. Check to see if this is a single-tail test or a two-sided test. This must be a two-tail test because the hypothesis contains the phrase different and does not specify an average order. α level: α the appropriate statistical test. Because the older variable is the ratio scale, the Z-score test or the t-test may be appropriate. The z-test is incorrect because the population standard deviation is unknown. In addition, because there are a lot of students and GPA is low, there is a design between subjects. For these factors, use an independent sample t-test. Let's calculate the t-value or let SPSS do it. The independent sample t-test command is an independent sample T-test (click the Analysis menu item at the top of the window, click Compare Average from the drop-down menu, and then click Independent Sample T Test from the pop-up menu): The Independent Sample t-Test dialog box is displayed. Then click the up arrow button to move the variable to the Test Variables pane. This example moves the old variable (the number of old siblings) to the <a0> Test variable </a0> box. Then click the down arrow button to move the variable in the Grouping Variables box. (If there is already a variable in the <a0> Grouping variable </a0> box, click it and click the down arrow to the left if it is not highlighted.) This example moves the GPA variable to the grouping variable box: YOU need to tell SPSS how to define the two groups. Click the Define Group button. The Define Group dialog box appears: Click the circle to the left of Cut Point:. Next, enter a value to divide the variable into two groups. Group 1 is defined as all scores above the cut point. Group 2 is defined as all scores that are less than the cut point. This example uses 3.007 (the median of the GPA variable) as the cut point value. To run the t-test, click the OK button in the Independent Sample t-Test dialog box. The output viewer is displayed with the results of the t-test. There are two main parts of the result: descriptive statistics and confidential statistics. First, descriptive statistics: DescriptionFor each of the two groups (defined by a grouping variable). In this example, there are 23 people with GPAs of 3.01 (N) or higher, an average of 1.04 years older siblings, and a sibling with a standard deviation of 1.186 years older. The number of GPAs is less than 3.01(N), with an average of 1.48 older siblings and a standard deviation of 1.310. The last column shows the standard error of the mean for each of the two groups. The second part of the output shows the estimated statistic: as before, a column labeled Equality Test for Leane Variance indicates whether the t-test assumption is met. Look at the column labeled Sig. under the heading Isoness Test for Leven Variance. In this example, the significance (p-value) of The Levene test is .383. If this value is less than α level of this test, you can reject the null hypothesis that the two groups have equal variability. In this example, .383 is greater than the α level of .05, so assume that the variances are equal and use the middle line of the output. A column labeled t indicates the observed or calculated t-value. In this example, assuming equal variance, the t-value is 1.180. (If you use a two-sided test, you can ignore the sign of t.) The column labeled df indicates the degrees of freedom associated with the t-test. In this example, there are 44 degrees of freedom. A column labeled Sig. (2 tails) indicates the p-values on both sides associated with the test. In this example, the p-value is .244. If this is one of the tests, check the critical t in the table. Determines whether H0 can be rejected: As before, the decision rule is specified in the following ways: ≤ α reject H0 if p is the case. In this example, H0 cannot be rejected because .244 is greater than 0.05. This means that there is not enough evidence for the upper or lower people in the GPA to conclude that the number of older siblings is different. If you are writing this to be published in the APA journal, the equal variance t-test is higher (M . . . . The statistically reliable difference in the average number of siblings in the elderly could not be clarified in 310), t(44), 1.18,p α 4 x 24000.24000). Pair sample t-test If two samples are involved and the values of each sample are collected from the same individual (that is, each individual gives two values, one for each group), or if the sample comes from a pair pair pair of pairs of pairs of pairs of matching pairs, it can be used as appropriate statistics. You can use a paired sample t-test to determine whether two averages are different from each other when the two samples on which the mean is based are taken from a matching or the same individual. InchesFor example, determine whether the number of brothers and sisters in a student is different. Write nulls and alternative hypotheses: H0:[muolder] μ≠μ the average number of siblings that young psy 216 students have μ. Check to see if this is a single-tail test or a two-sided test. This must be a two-tail test because the hypothesis contains the phrase different and does not specify an average order. α level: α the appropriate statistical test. The Z-score test or t-test may be appropriate because the old and young variables are on the ratio scale. The z-test is incorrect because the population standard deviation is unknown. In addition, the same student has reported a number of older and younger siblings, we have a design in the subject. For these factors, use the pair sample t-test. Let's let SPSS calculate the value of t. The pair sample t-test command is a short form of the Analysis > Compare Means -> Pair Sample T Test (click the Analysis menu item at the top of the window, click Compare Average from the drop-down menu, and then click Pair Sample T Test from the pop-up menu): The Pair Sample t Test dialog box is displayed. In the left pane of the Pair Sample t Test dialog box, click one of the variables. Then click on the other variables in the left pane. Click the arrow button to move the variable to the Pair Variables pane. In this example, select the old and young variables (the number of older and younger siblings) and click the arrow buttons to move the pair to the Pair Variables box. The output viewer is displayed with the results of the t-test. The results have three main parts: descriptive statistics, correlations between pairs of variables, and different term statistics. First, descriptive statistics: Shows descriptive statistics for two groups (defined by a pair of variables). In this example, 45 elderly people answer a sibling's question (N), with an average of 1.24 siblings and a standard deviation of 1.26. These same 45 people also answered the young brother's question (N), they have an average of 1.13 younger brothers, and the standard deviation is 1.20 younger brothers. The last column shows the standard error of the mean for each of the two variables. The second part of the output shows the correlation between pairs of variables: this indicates that there are 45 pairs of observations (N). The correlation between the two variables is shown in the third column. In this example, r is -.292.The column gives the p-value of the correlation coefficient. As usual, if the p-value is less than or equal to the alpha level, you can reject the null hypothesis that the population correlation coefficient ([delta]) is equal to 0. In this case, the null hypothesis cannot be rejected because p is .052. That is, there is not enough evidence to conclude that the population correlation ([delta]) is different from 0. The third part of the output is the difference between the two averages in the column labeled Average (in this example, 1.24 to 1.13 x 0.11 (due to rounding of errors). The following column is the standard deviation of the difference between the two variables (1.98 in this example): A column labeled t indicates the observed or calculated t-value. In this example, the t-value is 0.377 (the sign can be ignored). The column labeled df indicates the degrees of freedom associated with the t-test. In this example, there are 44 degrees of freedom. A column labeled Sig. (2 tails) indicates the p-values on both sides associated with the test. In this example, the p-value is .708. If this was one test, check the important value of t in the table. Determines whether H0 can be rejected: As before, the decision rule is specified as follows: if p is ≤ α, reject H0. In this example, H0 cannot be rejected because .708 is not less than or less than .05. This means that there is not enough evidence to conclude that the number of older and younger siblings is different. If we are writing this to publish in the APA journal, the pair sample t-test could not reveal a statistically reliable difference between the old (M-1.24, s-1.26) and α-young (M-1.13, s-1.20).