Children's developmental adaptation to changes in the environment

Children's Developmental Adaptation John Doe Children's Developmental Adaptation Introduction This assignment studies children's development adaptation to changes in the environment at different ages. This will be achieved through statistical analyses of results obtained from experiments conducted with 8 children of 12 months, 18 months, and 24 months age groups. The experiment recorded two different responses of each child while being restrained in a car seat for a period from 5 to 10 seconds. These responses are as Crying and Frustration while being restrained. Children's crying and frustration responses are used to examine their adaptation behaviors to environment changes through the following analyses: 1. Correlation between crying and frustration at ages 12, 18, and 24 months 2. Crying response at different ages 3. Frustration response at different ages. Method Observers measured crying responses on scale 0, 1, 2, 3, 4, and 5, where zero indicates, " no crying at all", and 5 indicates, " crying hysterically". Frustration responses were also measured on scale 0, 1, 2, 3, 4, and 5, where zero indicates, " no frustration at all", and 5 indicate, " extremely frustrated." The raw data are displayed in Table 1. Table 1 Raw Data from Observation Raw data are drawn randomly, and they represent three independent sample groups: 12 months, 18 months, and 24 months. Each sample group presents 8 observations and contains paired observations: crying and frustration. Responses of observations, illustrated in Table 1 are data for inferential statistical analyses. The aforementioned observations expressed through numerical values characterize nominal data set. Statistical methods for analyses will be selected based on the characteristics of nominal data; namely arithmetical operations cannot be

conducted over the response data. The response numbers from 0 to 5 will be used only for the purpose of tally to show frequencies of observed categories. Table 2 illustrates frequencies derived from raw data for three groups and two different responses. Table 2 Frequency Distribution of Observed Data 12 month age 18 month age 24 month age Scale 0 1 2 3 4 5 0 1 2 3 4 5 0 1 2 3 4 5 X 3 1 2 1 1 0 4 3 1 0 0 0 5 2 1 0 0 0 Y 5 1 1 1 0 0 2 0 5 0 1 0 3 1 1 2 0 1 Note: X = Crying; Y = Frustration. In the above table, the variables X and Y represent paired data. The paired data of each group will be used to study the correlation between X and Y through Spearman rank-order analysis. The interdependency of variables X and Y will be examined through two-way Chi-square test. Results Issue no 1. The purpose is to assess the relationship between X and Y at different ages. The results will demonstrate how strong the correlation of these two variables at different ages. The analysis given below is aimed to illustrate children's developmental adaptation to changes in the environment. The said goal will be achieved through the following three hypothesis tests. Hypothesis no. 1: H0: There is no relation between crying and frustration of children at the age of 12 months H1: There is a relation between crying and frustration of children at the age of 12 months. Hypothesis no. 2: H0: There is no relation between crying and frustration of children at the age of 18 months H1: There is a relation between crying and frustration of children at the age of 18 months. Hypothesis no. 3: H0: There is no relation between crying and frustration of children at the age of 24 months H1: There is a relation between crying and frustration of children at the age of 24 months. Table 3 Data for Spearman Rank Correlation Test Hypothesis no. 1 Hypothesis no. 2

Hypothesis no. 3 Age group: 12 months Age group: 18 months Age group: 24 months X Y X Y X Y 3 1 2 1 1 0 5 1 1 1 0 0 4 3 1 0 0 0 2 0 5 0 1 0 5 2 1 0 0 0 3 1 1 2 0 1 Note: The above data represent frequencies The Spearman tests were conducted using online software provided by the company Wessa (2013). Table 4 Results of Spearman Tests Hypothesis no. 1 Hypothesis no. 2 Hypothesis no. 3 Age group: 12 months Age group: 18 months Age group: 24 months Spearman Rank Correlation rho 0. 419354838709677 2-sided p-value 0. 407841294350643 Spearman Rank Correlation rho 0. 483870967741935 2-sided p-value 0. 330838172602464 Note: The test used data illustrated in Table 3. Table 5 Spearman Coefficient Result Analysis 12 months 18 months 24 months Spearman, rs 0. 819 0. 419 0. 483 Alpha 0. 05 0. 05 0. 05 P value (2-tailed) 0. 046 0. 41 0. 33 t critical value (0. 05) 2. 776 2. 776 2. 776 t test value 2. 855 0. 923 1. 103 Note: Illustrates relationship between crying and frustration at different ages. Table 5 displays the results of statistical significance tests. Spearman test returned the following answers: Hypothesis 1: The value of rs is 0. 82. This is a strong positive correlation. Hypothesis 2: The value of rs is 0. 419. Although technically a positive correlation, the relationship between variables is weak. Hypothesis 3: The value of rs is 0. 484. Although technically a positive correlation, the relationship between variables is weak. Table 6 illustrates decision analysis, and it is made based on the following criteria: If T test value < T critical (0. 05) accept null otherwise reject null; If P value > Alpha accept null otherwise reject null. Table 6 Decision Analysis Three Spearman rank-order correlations were conducted in order to determine if there were any relationships between children's crying and frustration at different ages when they were

being restrained in a car seat from 5 to 10 seconds. For hypothesis 1, a two-tailed significance indicated that there was a significant positive relationship between crying and frustration of children at age 12 months due to the change in the environment, rs (6) = 0. 819, p < 0. 05 and t test > t critical (0. 05). For hypothesis 2, a two-tailed significance indicated that there was not any significant positive relationship between crying and frustration of children at age 18 months due to the change in the environment, rs (6) = 0. 419, p > 0. 05 and t test < t critical (0. 05). For hypothesis 3, a two-tailed significance indicated that there was not any significant positive relationship between crying and frustration of children at age 18 months due to the change in the environment, rs (6) = 0. 483, p > 0. 05 and t test < t critical (0. 05). Issue 2. The objective is to assess how children's adaptation develops at different ages when outside environment is changed. In order to do so, the results of crying responses of children at different ages are used when they were restrained in car seats for 5 to 10 seconds. The analysis considers children's ages as explanatory variable X and crying responses as the response variable Y. The Chi-square test will determine if X and Y are independent; that is whether crying responses are independent of age groups. That is why; the following hypothesis test will be conducted: H0: There is no correlation between children's ages and crying responses due to the changes in outside environment. H1: There is a correlation between children's ages and crying responses due to the changes in outside environment. Table 7 Observed Frequencies (Age groups vs. Crying responses). X1 X2 X3 Total Y1 3 4 5 12 Y2 1 3 2 6 Y3 2 1 1 4 Y4 1 0 0 1 Y5 1 0 0 1 Total 8 8 8 24 Note: X1 = 12 months, X2 = 18 months, and X3 = 24

months. Y1 – Y6 shows crying on 0 to 5 scales. Table 8 Expected Frequencies (Age groups vs. Crying responses) Table 9 Chi-square Values (Age groups vs. Crying response)   X1 X2 X3   Y1 0. 25 0. 00 0. 25 0. 5 Y2 0. 50 0. 50 0. 00 1 Y3 0. 33 0. 08 0. 08 0. 5 Y4 1. 33 0. 33 0. 33 2 Y5 1. 33 0. 33 0. 33 2 X2 6 DF=(r-1)*(c-1) 8 Alpha 0. 05 X2 Critical (0. 05) 15. 51 X2 test < X2 Critical Null OK P value (8, 6) 0. 2 P value > Alpha Null OK A chi-square test of independence was conducted to determine if children's age groups and cry response are independent when they are being restrained in a car from 5 to 10 seconds. The test revealed that children's age groups and crying responses are independent, X2 (8, 0. 05) = 15. 51 < X2 test = 6, and p (8, 6) = 0. 2 > 0. 05. Issue 3. This section will analyze the results of frustration responses of children at different ages when they were being retrained in car seats for 5 to 10 seconds. Children's ages are considered as explanatory variable X and frustration responses as response variable Y. The Chi-square test will determine if X and Y are independent; that is frustration response is independent of age groups. That is why; the following hypothesis tests are conducted in this section: H0: There is no correlation between children's ages and frustration responses due to the changes in outside environment. H1: There is a correlation between children's ages and frustration responses due to the changes in outside environment. Table 10 Observed Frequency (Children age group vs. Frustration)   X1 X2 X3 Total Y1 5 2 3 10 Y2 1 0 1 2 Y3 1 5 1 7 Y4 1 0 2 3 Y5 0 1 0 1 Y6 0 0 1 1 Total 8 8 8 24 Table 11 Expected Frequency (Children age group vs. Frustration)   X1 X2 X3 Total Y1 3. 33 3. 33 3. 33 10 Y2 0. 67 0. 67 0. 67 2 Y3 2. 33 2. 33 2. 33 7 Y4 1. 00 1. 00 1. 00 3 Y5 0. 33 0. 33 0. 33 1 Y6 0. 33 0. 33 0. 33 1 Total 8 8 8 24 Table 12 Chi-

square Values (Age groups vs. Frustration response)

	X1	X2	X3	Total
Y1	0. 83	0. 53	0. 03	1. 4
Y2	0. 17	0. 67	0. 17	1
Y3	0. 76	3. 05	0. 76	4. 57
Y4	0. 00	1. 00	1. 00	2
Y5	0. 33	1. 33	0. 33	2
Y6	0. 00	0. 00	0. 00	0

X2 10. 97 DF=(r-1)*(c-1) 10 Alpha 0. 05 X2 Critical (0. 05) 18. 31 X2 test < X2 Critical Null OK P value (10, 10. 97) 0. 2 P value > Alpha Null OK A chi-square test of independence was conducted to determine if children's age groups and frustration response are independent when they are being restrained in car seats from 5 to 10 seconds. The test revealed that children's age groups and frustration responses are independent, $X2 (10, 0. 05) = 18. 31 < X2 test = 6$, and $p (10, 10. 97) = 0. 2 > 0. 05$. Summary. The concept adaptation applies to change that helps an organism becomes better suited to the changes in the environment. This experiment intended to study how children develop adaptation to changes in the environment. In order to do so, observers studied children's behaviors through crying and frustration responses when they were being restrained in car seats from 5 to 10 seconds. The observers conducted the observation among three age groups: 12 months, 18 months, and 24 months. The inferential statistical analyses revealed that level of crying and frustration responses are independent of ages. However, for children of age groups of 12 months there is a strong positive relation between crying and frustration due to the changes in the environment. The same is not observed for children of 18 months and 24 months age groups. Reference Wessa, P. (2013). Free statistics software: Office for research development and education, version 1. 1. 23-r7. Retrieved from www. wessa. net