# Therapy dogs on campus: An exploration of how dog therapy services affect undergraduate students' stress levels

*Tanna J. Lauriente and Drayden Kopp*

**Biological Sciences**

**Supervisor:** Dr. Nancy Flood

**Abstract:**

*University can be stressful for many undergraduates. Fortunately, there are various stress reduction strategies, including weekly dog therapy sessions, offered at Thompson Rivers University. This study investigated the effects of dog therapy on students via a self-reported stress survey. Students in a control group (n= 98), who did not visit the therapy dogs, and a test group (n= 108), who did, provided data on their stress level and various other factors. Students in the test group reported their stress levels before and after participating in a dog therapy session by circling a number on our stress scale, determining their stress scores. Tests of association were used to examine relationships between stress scores before visiting the dogs and various other factors. Two-sample t-tests were used to compare stress scores for students in the control group to those in the test group prior to the dog therapy, and paired t-tests were used to compare the stress scores of students in the test group before and after dog therapy. There appeared to be an association between course load and the stress score of students in the test*

*group before using the dog therapy (p= 0.018). There was no difference in stress score between students in the test group before dog therapy and those in the control group (p= 0.2771); there was, however, a significant difference in the average stress scores of students in the test group before and after they visited the therapy dogs (p= 0.0000); the results suggest that the dog therapy was successful in decreasing stress scores among students in the test group*.

## Introduction

Being a university undergraduate student can be stressful: a 2009 article reportedthat"10-12% of students are under extreme stress" (Peer et al., 2015, p. 91). Various factors may produce stress in students. Previous literature has identified some major categories of stressors, including academic, financial, and personal relationships (Peer et al., 2015). Academic stressors often include grades, career choice, GPA, exams, and assignment deadlines (Peer et al., 2015). Financial stressors, on the other hand, can include debt from student loans and not keeping to the desired budget (Peer et al., 2015). Personal relationships can likewise be stressors, ranging from not meeting family expectations to romantic relationships. Clearly, there is the potential for many stressors to afflict university students, and the accumulation of stress can lead to mental health problems. One article reported that some students felt depressed, hopeless, socially isolated, and anxious, and had difficulties concentrating, due to stress (Peer et al., 2015).

In recognition of the existence of various stressors, many university campuses have implemented animal-assisted therapy to reduce stress and stress-associated symptoms. One university brought dogs to the library during final exams and the students who took a self-reported stress survey were found to be less stressed after utilizing this therapy (Jalongo & McDevitt, 2015). Other studies have demonstrated that heart rate is reduced while petting dogs and a decrease in cortisol, epinephrine, and norepinephrine levels also occurs (Beetz et al., 2012).

Another study not only showed a reduction in stress, but also a reduction in psychosomatic symptoms caused by stress (Gonzalez-Ramirez et al., 2013). At Thompson Rivers University (TRU), where the authors study, St. John's Ambulance has volunteers come to the campus with their dogs weekly to help alleviate stress in students.

The main focus of this study was to determine if the dog therapy produces a statistically significant reduction in the stress levels of students who use this service. This was measured using a self-reported stress survey, and we determined a stress score for before and after using the dog-therapy service based on this information. This study also investigated what other variables affect stress, such as age, gender, course load, year of study, field of study, whether the student has a part-time job and, if so, how many hours worked per week. Our goals were to see if there was difference in stress before and after using the dog therapy service, if there was a difference in stress levels of students who did not use the service and the initial stress scores of students who did, and to examine whether stress was related to any of the other variables on which we collected data. We predicted that the dogs help alleviate stress, as has been suggested in the previous studies. We also predicted that working a part-time job, maintaining a high course load, and studying within the Faculty of Science would increase stress. Working part-time and enrolling in more courses requires students to balance additional responsibilities, including handling stressful co-workers or customers and more assignments and, thus, more deadlines. We felt that because students studying science have to balance not only lecture material and assignments, but also lab material, including assignments and reports, they might feel more stressed than students in other faculties.

We also collected data on age, gender and year of study, but predicted that these would not affect students' stress scores. In general, we felt that all these factors have their own potential stressful challenges that would not outweigh one

another. Finally, we predicted that the stress scores of students in our control group would be similar to those of the experimental group before they visited the dogs.

## Methods

### Participants

Data for this experiment was collected from student volunteers in the Old Main building on the Kamloops campus of Thompson Rivers University. We collected data from two different groups of randomly chosen volunteers. Our control group (n = 98) was comprised of students who were present in Old Main, but not visiting the therapy dogs, whereas the experimental group(n = 108)was comprised of students who were present in the same building and visiting the dogs.

### Materials

We handed out surveys to collect data on students' stress levels as well as other variables that we felt might be correlated with stress. Two different surveys were provided, one for the experimental group and one for the control group. Both surveys asked the participants about their field of study how frequently they used the dog therapy, their year of study, gender, age, course load, and whether they had a part- time job. The survey also included a stress score scale from 1 to 5, in which 1 indicated most stressed and 5 indicated least stress (Appendix A). The only difference between the surveys was that the control survey asked the participants what their stress level was at that moment, whereas the experimental survey asked for two stress levels: one before and one after using the dog therapy. Both surveys determined the participants' stress level by the participants circling the respective stress score on the scale provided on the survey. In both the control and experimental groups, consent was obtained before handing out the survey.

## Procedure

Before the study was initiated, a Research Ethics, Human Subjects protocol form was completed. The data for our control group was collected from 10:30 AM -11:20 AM in Old Main. We choose to collect control data at this time because it is a similar time to when the dog therapy service is operational on Thursdays in Old Main (10:00 AM - 2:00 PM) and this was also the time period used to collect the experimental data. We collected the experimental data for a longer period of time in comparison with the control data because we wanted to obtain an approximately equal sample size between the control and experimental groups. For the control group, random students were approached and asked if they would participate in the study, after we briefly explained the purpose of our study. If they agreed, the control survey form was given, and we explained the stress score (i.e., 1 = most stressed, and 5 = least stressed). For the experimental group, students who approached the therapy dogs and started to pet the dogs were asked if they would participate in our study, after we explained the purpose of the study. If they agreed, we handed them the experimental survey form and explained the stress score scale. For both groups, the participants were given 5-10 minutes to complete the survey, and when we collected the surveys we asked if they had any questions. We then thanked the volunteers for their participation.

## Data Analysis

We created a couple rules of thumb based on preliminary examination of the data collected. When a range of work hours was given, we took the mean of this range. As well, if two stress scores were circled, we took the higher score. For all of the statistical tests run, the significance level was $p< 0.05$.

To see if there was a difference between stress levels before and after using the dog therapy, we used a paired test. We tested for normality via the KS

test because our sample size was greater than 25 (both had p values < 0.010). Since the difference between the data sets did not have a normal distribution, and since the data was non-normal ($p < 0.01$) we used a Wilcoxon Matched-Pairs Signed Rank Test.

To compare the stress scores of participants in the control group with the stress scores of participants in the experimental group before they visited the therapy dogs, we used a test for independent samples. We tested both data sets for normality via the KS test, and since the distribution of both samples was non-normal (control stress score p value < 0.0010; prior stress score p value < 0.005) we did a Mann-Whitney U Test.

To test for association between prior stress before using the dog therapy and the other suspected stressors, we used Chi tests of independence. Since these tests have to have expected values greater than one, we had to lump several categories together. In the test examining faculty and prior stress, we lumped "Arts", "Journalism", "Visual Arts", "Fine Arts", "ESL, "Education", "Theatre", "Social Work", "Culinary Arts" and "Adventure and Tourism" as "Faculty of Arts"; we lumped "Science", "NRS", "Computer Science", "Architecture", "Nursing" and "Health Sciences" as "Faculty of Science"; we lumped "Law" and "Business" together as "law/business"; we lumped "Horticulture" and "Human Services" as "diploma". With this test, we also lumped the two lowest stress scores together as "least stressed". The sample size for this test was 108.

In the Chi square test of independence between prior stress and frequent use of dog therapy as well as the test between prior stress and gender, we lumped the two lowest stress scores together as "least stressed". The prior stress and frequent use of dog therapy test had a sample size of 107, and the prior stress and gender test had a sample size of 108.In the test examining the relationship between age and prior stress, we created the following three age categories: 19 or younger, 20-21, and 22 or older. For the 19 or younger category, we lumped the

ages 16, 18 and 19 together. For the 22 or older category, we lumped the ages 22, 23, 24, 25, 26, 27, and 34 together. The sample size was 105 for this test. In the test looking at whether there was a correlation between course load and stress, we created 4 course-credit categories: 3-6 credits, 7-10 credits, 12-14 credits, and 16 or more credits. We lumped the two highest stress scores together as "most stressed" and lumped the two lowest stress scores together as "least stressed". The sample size for this test was 96. In the test examining the relationship between whether a student had a part-time job and prior stress, no lumping was needed. The sample size was 108 for this test. In the test examining year of study and prior stress, we lumped any year from third year or higher as upper years. The sample size for this test was 108.

**Results**

Figure 1 compares the mean stress score of people before (3.8±2.3) and after (2.7 ± 2.0) using the dog therapy. The difference was significant (W = 785.0, (= p = 0.000) Since lower scores indicate higher levels of stress, this suggests that the therapy reduced the amount of stress felt by students. In fact, on average, there was a 33.3% reduction in stress following a visit to the dogs.

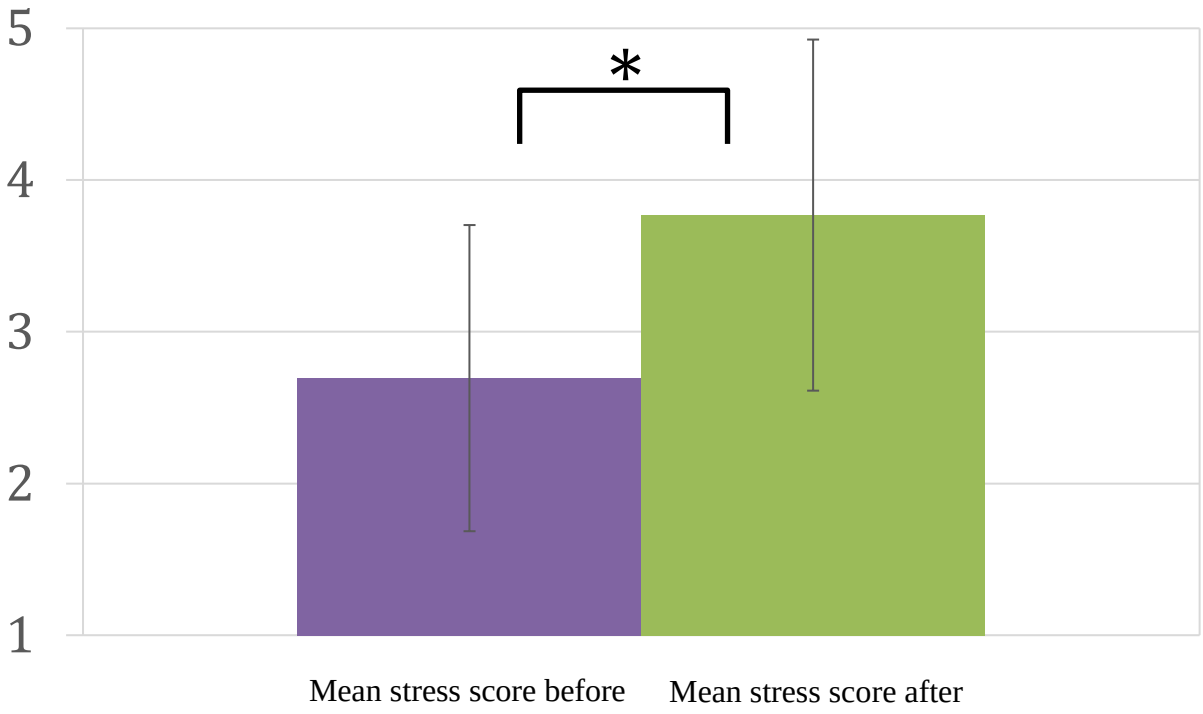


Figure 1. The mean stress score of the experimental group before and after visiting the therapy dogs (n= 108). The error bars represent the standard deviation (SD).

Figure 2 compares the mean stress scores of the control group (2.7±2.0) and the experimental group prior to using the dog therapy (2.9 ±2.1)($p = 0.2771$). There is only a 6.5% difference in mean stress score between the two groups, which is not significant ($W=10585.5$, $p = 0.2771$). Before using the dog therapy, all students were equally stressed.

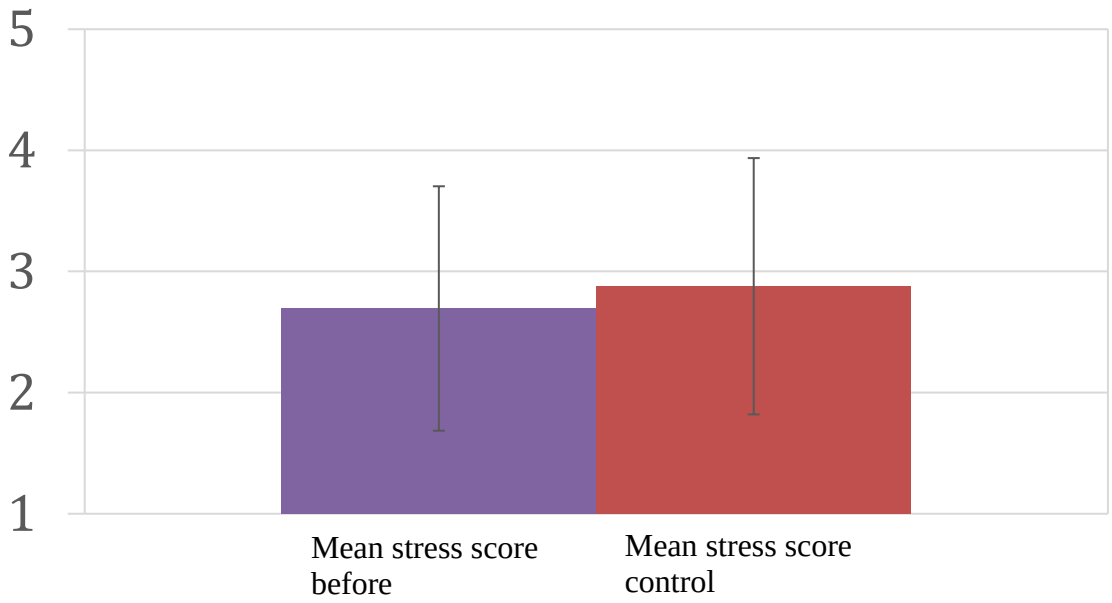


Figure 2. The mean stress score of the experimental group before utilizing the dog therapy compared to the mean stress score of the control group. The error bars represent the standard deviation (SD).

Comparing the mean stress scores of the three conditions, the “after using the dog therapy” condition has the highest stress scoreof3.8±1.2compared to the control group mean stress score of 2.9±1.1 and the “before using the dog therapy” group with a stress score of 2.7±1.0. This means that the students were less stressed after utilizing the therapy in comparison to the other conditions.

Table 2 summarizes all the Chi square tests of association between prior stress score to using the dog therapy and other plausible stress-causing variables. According to the p values, the only variable that is associated with stress is course load ($p = 0.018$).

Table 2. Summary of the chi square tests of association between prior stress score before visiting the dogs and potential stress causing variables.

| | $X^2$ calc | p value |
|---|---|---|
| Faculty | 9.977 | 0.352 |
| Frequent Use of Dog Therapy | 13.843 | 0.128 |
| Gender | 0.573 | 0.903 |
| Age | 5.794 | 0.67 |
| Course Load | 18.423 | 0.018* |
| Part-time Job | 6.093 | 0.192 |
| Year of Study | 7.776 | 0.456 |

**Discussion**

We hypothesized that the stress score of students after utilizing the dog therapy would be higher than the stress score prior (i.e. that the students would be less stressed), and our data supports this prediction (p-value= 0.000). Previous research has also shown a reduction in stress after animal-assisted therapy, indicated by several physiological variables, including students having a lower heart rate and a decrease in cortisol, epinephrine and norepinephrine levels (Beetz et al., 2012). Students also reported reduced stress after animal therapy on self-reported stress surveys (Jalongo & McDevitt, 2015). Similar to Jalongo and McDevitt (2015), we also used a self-reported stress survey to measure stress. Both Jalongo and McDevitt (2015) and our surveys asked students to report their stress level after utilizing the dog therapy service. In both aforementioned studies, the students reported reduced stress after using the dog therapy.

There are a few reasons why students might have experienced a reduction in stress after utilizing this therapy. From a social aspect, the dog therapy service provides an opportunity to not only interact with the dogs, but to meet other students. Interacting with other people may reduce feelings of social isolation and loneliness, both of which could contribute to stress. In addition, the feeling of loneliness might decrease because the student has a dog there to keep him/her

company. From a physiological point of view, previous literature has reported a reduction in stress hormones and release of oxytocin, which may be due to the petting motion (Beetz et al., 2012). From a reduction in the amount of stress hormones released, the student would feel a reduction of stress symptoms, such as depression, anxiety, and loneliness, and thus would report a lower stress level, which corresponds to a higher stress score on our stress scale. Another possible explanation for the reduction in stress may be release of endorphins, which may be triggered by petting the dogs or by social interactions such as laughing and smiling (Dunbar et al., 2011). Endorphins are pleasure hormones that help reduce stress by inhibiting stress hormone release (Amir et al., 1980). Inhibiting the release of stress hormones would most likely result in an overall reduction of stress.

Our prediction that the stress scores of the control and experimental group prior to a dog therapy session would not differ was also supported. This shows that use of the dog therapy service is not biased towards more-stressed or less-stressed students, and that the students who attend this therapy are as stressed before visiting the dogs as is the general undergraduate population. Thus, it appears that students who do not attend this service would be likely to receive the same stress reduction benefits as students who do.

The only stressor that we have evidence for being associated with stress is course load. Taking more courses seems to lead to lower stress score, suggesting a higher stress level. This may be due to the student's perception of course load. Some researchers have discovered a "positive correlation between perception of course load and test anxiety" as well as a "negative correlation between test anxiety and time management" (Sansgiry & Sail, 2006, p 4-5). It may be that the more courses students take, the more anxious they are because they have an increase in stress due to being overwhelmed with assignments and exams that all have deadlines close to one another, which results in greater test anxiety.

In the future, it might be useful to repeat this study, but survey the students again after a period of time (e.g., at the end of the semester) to see if prolonged use of the dog therapy provides a reduction in stress level (higher stress score). It would also be interesting to see if the students that use the dog therapy attend other wellness centre programs more frequently.

There are some limitations to our experiment. For instance, we could have had a more precise stress scale (e.g. from 1-10). We could also have collected physiological data, such as heart rate, that would allow us to validate our findings that the dog therapy reduces stress, and not simply rely on a self-report stress survey. A possible improvement may be having the therapy more than once a week and at different times of day to allow more students to enjoy the stress-reduction benefits that the dog therapy provides.

## Conclusion

The TRU Dog Therapy stress reduction program seems to significantly reduce students' stress, at least in the short term. This is beneficial, since a reduction in stress will likely help alleviate other mental health issues, such as depression, anxiety, loneliness, any of which can lead to difficulty in concentrating(Peer et al., 2015). Dog therapy might, therefore, be one way of allowing students to improve their overall academic performance, as well as their quality of life.

## Acknowledgements

We would like to thank our supervisor Nancy Flood, St. John's Ambulance volunteers, and the volunteers who participated in this study for their help in our research.

**References**

Amir, S., Brown, Z. W., & Amit, Z. (1980). The role of endorphins in stress: Evidence and speculations. *Neuroscience & Biobehavioral Reviews*, *4*(1), 77–86. https://doi.org/10.1016/0149-7634(80)90027-5

Beetz, A., Uvnäs-Moberg, K., Julius, H., & Kotrschal, K. (2012). Psychosocial and Psychophysiological Effects of Human-Animal Interactions: The Possible Role of Oxytocin. *Frontiers in Psychology*, *3*. https://doi.org/10.3389/fpsyg.2012.00234

Dunbar, R. I. M., Baron, R., Frangou, A., Pearce, E., van Leeuwen, E. J. C., Stow, J., … van Vugt, M. (2012). Social laughter is correlated with an elevated pain threshold. *Proceedings of the Royal Society B: Biological Sciences*, *279*(1731), 1161–1167. https://doi.org/10.1098/rspb.2011.1373

González-Ramírez, M. T., Ortiz-Jiménez, X. A., & Landero-Hernández, R. (2013). Cognitive–Behavioral Therapy and Animal-Assisted Therapy: Stress Management for Adults. *Alternative and Complementary Therapies*, *19*(5), 270–275. https://doi.org/10.1089/act.2013.19505

Jalongo, M.R., & McDevitt, T. (2015). Therapy Dogs in Academic Libraries: A Way to Foster Student Engagement and Mitigate Self-Reported Stress during Finals. *Public Services Quarterly*, *11*(4), 254–269. https://doi.org/10.1080/15228959.2015.1084904

Peer, J. W., Hillman, S. B., & Van Hoet, E. (2015). The Effects of Stress on the Lives of Emerging Adult College Students: An Exploratory Analysis. *Adultspan Journal*, *14*(2), 90–99. https://doi.org/10.1002/adsp.12007

Sansgiry, S. S., & Sail, K. (2006). Effect of students' perceptions of course load on test anxiety. *American Journal of Pharmaceutical Education, 70*(2), 26.

## Appendix A

Experimental Survey:

How does the dog therapy service at TRU affect stress levels of students?

For the Biology 3000 biometrics class, we are investigating the effectiveness of the dog therapy on student stress levels. By completing this survey, you will enable us to assess the effectiveness of this service statistically. This survey is designed to be completed within 5 minutes. This information will be kept confidential, and all personal information will be disposed of at the end of the fall 2016 semester.

By completing this survey you are giving consent for us to use this information for our research project. You can withdraw from the survey at anytime if you desire.

Names are collected solely to prevent duplicates.

Name:_____

| | |
|---|---|
| 1. What faculty (Science, Art, Business, etc.) ? | _____ |
| 2. How frequently do you use the dog therapy (per month)? | 1 2 3 4 |
| 3. Year of study: | 1st 2nd 3rd 4th |
| 4. Gender | Male Female Other |
| 5. Age | _____ |
| 6. Course Load (credits) | _____ |
| 7. Do you have a part time job? | Yes / No |
| 8. If you answered yes to 7, how many hours do you work per week? | _____ |
| 9. How stressed are you prior to visiting the dog therapy, on a scale from 1 – 5? | 1 2 3 4 5<br>Most stressed Least Stressed |
| 10. How stressed are you after visiting the dog therapy, on a scale from 1- 5? | 1 2 3 4 5<br>Most stressed Least Stressed |

Control Survey:

How does the dog therapy service at TRU affect stress levels of students?

For our Biology 3000 biometrics class, we are investigating the effectiveness of dog therapy on student stress levels. By completing this survey, you will enable us to assess the effectiveness of this service statistically. This survey is designed to be completed within 5 minutes. This information will be kept confidential, and all personal information will be disposed of at the end of the fall 2016 semester.

By completing this survey you are giving consent for us to use this information for our research project. You can withdraw from the survey at any time if you desire.

Names are collected solely to prevent duplicates.

Name:_____

| | |
|---|---|
| 1. What faculty (Science, Art, Business, etc.) ? | _____ |
| 2. Have you ever visited the dog therapy this semester? | Yes / No |
| 3. Year of study: | 1st 2nd 3rd 4th |
| 4. Gender | Male Female Other |
| 5. Age | _____ |
| 6. Course Load (credits) | _____ |
| 7. Do you have a part time job? | Yes / No |
| 8. If you answered yes to 7, how many hours do you work per week? | _____ |
| 9. How stressed are you at this moment, on a scale from 1 – 5? | 1 2 3 4 5<br>Most stressed Least Stressed |

**Appendix B**

Wilcoxon Signed Rank Test: delta therapy Results from Minitab

Test of median = 0.000000 versus median ≠ 0.000000

| | N | N for Test | Wilcoxon Statistic | P | Estimated Median |
|---|---|---|---|---|---|
| delta therapy | 108 | 99 | 785.0 | 0.000 | -1.000 |

Mann-Whitney Test and CI: Stress level, Stress prior to dog therapy Results from Minitab

| | N | Median |
|---|---|---|
| Stress level | 98 | 3.0000 |
| Stress prior to dog therapy | 108 | 3.0000 |

Point estimate for η1 - η2 is 0.0000
95.0 Percent CI for η1 - η2 is (-0.0001,0.0000)
W = 10585.5
Test of η1 = η2 vs η1 ≠ η2 is significant at 0.3009
The test is significant at 0.2771 (adjusted for ties)

Chi square test of association between prior stress level before using the dog therapy and course load results from Minitab

Rows: Course Load (credits)  Columns: Stress prior to dog therapy

| | 1 | 3 | 5 | All |
|---|---|---|---|---|
| 6 | 1 | 1 | 3 | 5 |
| | 2.083 | 1.823 | 1.094 | |
| 10 | 3 | 5 | 1 | 9 |
| | 3.750 | 3.281 | 1.969 | |
| 14 | 5 | 14 | 9 | 28 |
| | 11.667 | 10.208 | 6.125 | |
| 15 | 25 | 11 | 7 | 43 |
| | 17.917 | 15.677 | 9.406 | |
| 17 | 6 | 4 | 1 | 11 |
| | 4.583 | 4.010 | 2.406 | |
| Missing | 6 | 6 | 0 | * |
| All | 40 | 35 | 21 | 96 |