How do university training and subsequent practical experience affect expertise in **clinical psychology**? To answer this question we developed methods to assess psychological knowledge and the competence to diagnose, construct case conceptualizations, and plan psychotherapeutic treatment: a knowledge test and short case studies in a first study, and a complex, dynamically evolving case study in the second study. In our cross-sectional studies, **psychology** students, trainees in a certified postgraduate psychotherapist curriculum, and behavior therapists with more than 10 years of experience were tested (100 in total: 20 each of novice, intermediate, and advanced university students, postgraduate trainees, and therapists). **Clinical** knowledge and competence increased up to the level of trainees but unexpectedly decreased at the level of experienced therapists. We discuss the results against the background of expertise research and the training of **clinical** psychologists (in Germany). Important factors for the continuing professional development of psychotherapists are proposed.

Vollmer, S., Spada, H., Caspar, F., & Burri, S. (2013). Expertise in clinical psychology. The effects of university training and practical experience on expertise in clinical psychology. *Frontiers in psychology*, *4*.

**SPSS dataset:**

* Participant type: novice psychology students, intermediate psychology students, advanced university students, postgraduate trainees, therapists
* Competence: an average score of clinical knowledge and competence based on the knowledge test and short case studies.

**Questions:**

Since this assignment is longer due to multiple ways to run ANOVAs, no data screening is necessary except Levene’s below. Data screening will be part of the next take home exam, so be sure you remember/practice the steps. All the work below should be completed with SPSS.

1. What is the critical F value for this experiment (cut off score)?
2. Run the ANOVA test as a One-Way analysis in SPSS.
   1. Include means box.
   2. Include homogeneity test box.
      1. Did you meet the homogeneity assumption?
      2. Why or why not?
   3. Include the ANOVA one-way box.
3. Was the omnibus ANOVA test significant?
4. Create a set of orthogonal contrasts for this study.
   1. List the contrasts here (make a table).
   2. Show that the contrasts are orthogonal.
5. Run those contrasts with a One-Way analysis and include the output (remember it’s two boxes).
   1. Which contrasts were significantly different?
6. Run the ANOVA test as a GLM analysis in SPSS.
   1. Include a means box.
   2. Include a homogeneity test box.
   3. Include the ANOVA box.
7. Calculate the following effect sizes:
   1. R2
   2. **ω**2
8. Complete the following table using all pairwise comparisons as your correction point:

|  |  |
| --- | --- |
| Post Hoc Correction | Corrected value |
| Bonferroni | Alpha = |
| Sidak | Alpha = |
| Dunnett’s | Mean difference = |
| Tukey | Mean difference = |
| Fisher-Hayter | Mean difference = |
| Scheffe | Adjusted F cut off = |

1. Run multiple post hoc procedures (no output needed). Remember, for a real analysis, you would only run *one* type of post hoc. This question should show you how each post hoc corrects for type 1 error by changing the p-values through the smallest mean difference scores or alpha. For the following comparisons, list the p-values for each test:

|  |  |  |
| --- | --- | --- |
| Type of Post Hoc | Advanced Students vs Post Graduate Trainees | Intermediate students versus Therapists |
| Bonferroni |  |  |
| Sidak |  |  |
| Tukey |  |  |
| SNK |  |  |
| REGQ |  |  |
| Scheffe |  |  |

1. Run a trend analysis in either version (One-Way or GLM). Include the trend analysis output.
   1. Is there a significant trend?
   2. Which type?
2. Make a bar chart of the results from this study (things to check: x axis, y axis, y axis length, error bars)
3. Write up a results section outlining the results from this study. Use two decimal places for statistics (except when relevant for p-values). Be sure to include the following:
   1. A reference to the figure you created (the bar chart) – this allows you to not have to list every single mean and standard deviation.
   2. Very brief description of study and variables.
   3. The omnibus test value and if it was significant.
   4. At least three post hoc tests/contrasts describing what happened in the study and their relevant statistics.
   5. Effect sizes for all statistics.

**Theoretical Questions:**

1. If I ran all pairwise comparisons, what would the type 1 error rate be in the experiment?
2. What is the “omnibus” test (i.e. what does it mean when someone says omnibus test)?
3. What is the systematic variance estimate when using ANOVA?
4. What is the unsystematic variance estimate when using ANOVA?

**Fill in the following ANOVA table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Source** | **SS** | **df** | **MS** | **F** |
| Between | 5157.0 |  | 1719.0 |  |
| Within | 5042.4 |  |  |  |
| Total |  | 47 |  |  |

For practice on these tables: https://people.richland.edu/james/ictcm/2004/anovagen.php