General Assumptions for Exploratory Factor Analysis (EFA)

- High model fit indices

- Fewer cross-loadings

- At least 3 significant loadings (> 0.30) per factor

- Use oblique rotation (due to correlations among personality traits)

- Use WLS extraction method (because of 5-point Likert scale = categorical data)

R Code Steps (Using psych package)

1. Install and load the package

```
install.packages("psych")

library(psych)
```

2. Check data suitability

```
KMO(ZTBS)

cortest.bartlett(cor(ZTBS), n = nrow(ZTBS))
```

3. Determine number of factors

```
fa.parallel(ZTBS)

vss(ZTBS)
```

Results:
- Parallel analysis suggests 22 factors
- VSS and BIC suggest 8 factors

4. Run EFA with 8 factors

```
library(GPArotation)

efa_result <- fa(ZTBS, nfactors = 8, fm = "wls", rotate = "oblimin")

loadings_df <- as.data.frame(efa_result$loadings)

View(loadings_df)
```

5. Print fit indices

```
print(efa_result$rms)   # RMSR

print(efa_result$fit)   # Chi-square
```

```
print(efa_result$TLI)   # TLI

print(efa_result$BIC)   # BIC
```

Descriptives and Internal Consistency

1. Load the dataset

```
library(readxl)

F1 <- read_excel("F1", sheet = "Sheet1")
```

2. Descriptive statistics

```
desc_stats <- describe(F1)

print(desc_stats)
```

3. Reliability (Internal consistency)

```
alpha_val <- alpha(F1)

omega_val <- omega(F1)

cat("Cronbach's Alpha:", alpha_val$total$raw_alpha, "\n")

cat("Omega:", omega_val$omega.tot, "\n")
```

4. Correlation analyses

```
item_item_corr <- cor(F1, use = "pairwise.complete.obs")

mean_item_item_corr <- mean(item_item_corr[lower.tri(item_item_corr)])

item_total_corr <- apply(F1, 2, function(x) cor(x, rowSums(F1[, setdiff(1:ncol(F1),
which(names(F1) == names(x)))])))

mean_item_total_corr <- mean(item_total_corr)

cat("Mean item-item correlation:", mean_item_item_corr, "\n")

cat("Mean item-total correlation:", mean_item_total_corr, "\n")
```