Understanding autistic friendships - Hypothesis 1

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Load Packages and Data

```
library(tidyverse)
library(car)
library(effectsize)
```

```
data <- read.csv("autistic.friendship.data.csv")
```

Demographic Information

Neurotype

```
table(data$Neurotype)
```

```
##
##  No Yes
##  66  95
```

```
table(data$Dianosis)
```

```
##
##                      Awaiting assessment   Prefer not to say  Received diagnosis
##                   66                   10                   1                   74
##      self-diagnosed
##                   10
```

Age

```
summarise(data,m = mean(Age,na.rm = TRUE),
                sd = sd(Age,na.rm = TRUE))
```

```
##          m       sd
## 1 29.51299 12.93283
```

Gender

```
table(data$Gender)
```

```
##
##                     Man              Non-binary       Prefer not to say
##                      24                      18                       2
## Prefer to self-describe                   Woman
##                       4                     113
```

Country of Residence

```
table(data$Residence)
```

```
##
##  __other  England Scotland
##       61       37       63
```

```
table(data$Residence.Other)
```

```
##
##                            all over Asia, nomadic                Australia
##                       100                         1                        5
##                   Austria                   Belgium                   Canada
##                         1                         1                        2
##                   Finland                   Finland                   france
##                         1                         1                        1
##                   Germany                   Germany                Hong Kong
##                         2                         1                        2
##                   Hungary                   Ireland                  Ireland
##                         2                         1                        1
##         Northern Ireland              South Africa              South Korea
##                         1                         1                        1
##                     Spain               Switzerland             Switzerland
##                         1                         1                        1
##            United states             United States           United States
##                         1                        12                        4
## United States of America                        Us                       US
##                         2                         2                        1
##                      usa                       Usa                      USA
##                         1                         1                        8
##                    Wales
##                         1
```

H1: Prepare Data

Isolating columns for t.test

```r
h1.data <- data %>%
  dplyr::select(Participant.Private.ID, Neurotype,
                matches("^(SymRec|Age|Sim|Enjoy|Aid|Commu)\\.\\d+$"))
```

Exclude participants with missing data

```r
max_missing <- 2

check_missing <- function(df, pattern) {
  rowSums(is.na(df %>% select(matches(pattern))))
}

h1.data <- h1.data %>%
  mutate(
    SymRec_missing = check_missing(., "^SymRec\\.\\d+$"),
    Age_missing = check_missing(., "^Age\\.\\d+$"),
    Sim_missing = check_missing(., "^Sim\\.\\d+$"),
    Enjoy_missing = check_missing(., "^Enjoy\\.\\d+$"),
    Aid_missing = check_missing(., "^Aid\\.\\d+$"),
    Commu_missing = check_missing(., "^Commu\\.\\d+$")
  ) %>%
  filter(
    SymRec_missing <= max_missing,
    Age_missing <= max_missing,
    Sim_missing <= max_missing,
    Enjoy_missing <= max_missing,
    Aid_missing <= max_missing,
    Commu_missing <= max_missing
  ) %>%
  select(-ends_with("_missing"))
```

Recode Variables

```r
likert_map <- c(
  "not at all important" = 1,
  "slightly important" = 2,
  "moderately important" = 3,
  "very important" = 4,
  "extremely important" = 5
)

h1.data <- h1.data %>%
  mutate(across(
    matches("^(SymRec|Age|Sim|Enjoy|Aid|Commu)\\.\\d+$"),
    ~ {
      val <- str_to_lower(trimws(as.character(.)))
      dplyr::recode(val,
                    "not at all important" = 1,
                    "slightly important" = 2,
```

```
                    "moderately important" = 3,
                    "very important" = 4,
                    "extremely important" = 5,
                    .default = NA_real_
      ) %>%
        as.numeric()
    }
  ))
```

Calculate Means for Subscales

```
h1.means <- h1.data %>%
  rowwise() %>%
  mutate(
    SymRec_mean = mean(c_across(matches("^SymRec\\.\\d+$")), na.rm = TRUE),
    Age_mean = mean(c_across(matches("^Age\\.\\d+$")), na.rm = TRUE),
    Sim_mean = mean(c_across(matches("^Sim\\.\\d+$")), na.rm = TRUE),
    Enjoy_mean = mean(c_across(matches("^Enjoy\\.\\d+$")), na.rm = TRUE),
    Aid_mean = mean(c_across(matches("^Aid\\.\\d+$")), na.rm = TRUE),
    Commu_mean = mean(c_across(matches("^Commu\\.\\d+$")), na.rm = TRUE)
  ) %>%
  ungroup() %>%
  select(Participant.Private.ID, Neurotype, ends_with("_mean"))
```

H1: Main Analysis

Group Means

```
group_means <- h1.means %>%
  mutate(
    Neurotype = case_when(
      Neurotype %in% c("Yes", "yes", "YES") ~ "Autistic",
      Neurotype %in% c("No", "no", "NO") ~ "Non-autistic",
      TRUE ~ as.character(Neurotype)
    ),
    Neurotype = factor(Neurotype, levels = c("Autistic", "Non-autistic"))
  ) %>%
  group_by(Neurotype) %>%
  summarise(
    n = n(),

    Symmetrical_Reciprocity_Mean = mean(SymRec_mean, na.rm = TRUE),
    Symmetrical_Reciprocity_SD   = sd(SymRec_mean, na.rm = TRUE),

    Agency_Mean = mean(Age_mean, na.rm = TRUE),
    Agency_SD   = sd(Age_mean, na.rm = TRUE),

    Similarity_Mean = mean(Sim_mean, na.rm = TRUE),
```

```
    Similarity_SD   = sd(Sim_mean, na.rm = TRUE),

    Enjoyment_Mean = mean(Enjoy_mean, na.rm = TRUE),
    Enjoyment_SD   = sd(Enjoy_mean, na.rm = TRUE),

    Instrumental_Aid_Mean = mean(Aid_mean, na.rm = TRUE),
    Instrumental_Aid_SD   = sd(Aid_mean, na.rm = TRUE),

    Communion_Mean = mean(Commu_mean, na.rm = TRUE),
    Communion_SD   = sd(Commu_mean, na.rm = TRUE)
  )

group_means
```

```
## # A tibble: 2 x 14
##   Neurotype        n Symmetrical_Reciprocit~1 Symmetrical_Reciproc~2 Agency_Mean
##   <fct>        <int>                    <dbl>                  <dbl>       <dbl>
## 1 Autistic        95                     3.87                  0.647        1.18
## 2 Non-autistic    66                     3.63                  0.615        1.19
## # i abbreviated names: 1: Symmetrical_Reciprocity_Mean,
## #   2: Symmetrical_Reciprocity_SD
## # i 9 more variables: Agency_SD <dbl>, Similarity_Mean <dbl>,
## #   Similarity_SD <dbl>, Enjoyment_Mean <dbl>, Enjoyment_SD <dbl>,
## #   Instrumental_Aid_Mean <dbl>, Instrumental_Aid_SD <dbl>,
## #   Communion_Mean <dbl>, Communion_SD <dbl>
```

```
.05/8
```

```
## [1] 0.00625
```

Symmetrical Reciprocity

```
t.test(SymRec_mean ~ Neurotype, data = h1.means, conf.level = 0.9917) %>%
  print(digits = 10)
```

```
##
##  Welch Two Sample t-test
##
## data:  SymRec_mean by Neurotype
## t = -2.351938, df = 144.37388, p-value = 0.0200267
## alternative hypothesis: true difference in means between group No and group Yes is not equal to 0
## 99.17 percent confidence interval:
##  -0.50638351133  0.03268563026
## sample estimates:
##  mean in group No mean in group Yes
##       3.630519481       3.867368421
```

```
cohens_d(SymRec_mean ~ Neurotype, data = h1.means)
```

```
## Cohen's d |         95% CI
## -------------------------
## -0.37     | [-0.69, -0.06]
##
## - Estimated using pooled SD.
```

Agency

```
t.test(Age_mean ~ Neurotype, data = h1.means, conf.level = 0.9917) %>%
  print(digits = 10)
```

```
##
##  Welch Two Sample t-test
##
## data:  Age_mean by Neurotype
## t = 0.26366814, df = 129.10268, p-value = 0.792456
## alternative hypothesis: true difference in means between group No and group Yes is not equal to 0
## 99.17 percent confidence interval:
##  -0.1083229400  0.1319539873
## sample estimates:
##  mean in group No mean in group Yes
##       1.188131313       1.176315789
```

```
cohens_d(Age_mean ~ Neurotype, data = h1.means)
```

```
## Cohen's d |        95% CI
## ------------------------
## 0.04      | [-0.27, 0.36]
##
## - Estimated using pooled SD.
```

Similarity

```
t.test(Sim_mean ~ Neurotype, data = h1.means, conf.level = 0.9917) %>%
  print(digits = 10)
```

```
##
##  Welch Two Sample t-test
##
## data:  Sim_mean by Neurotype
## t = -7.048601, df = 138.3289, p-value = 7.830308e-11
## alternative hypothesis: true difference in means between group No and group Yes is not equal to 0
## 99.17 percent confidence interval:
##  -1.0109025268 -0.4542224067
## sample estimates:
##  mean in group No mean in group Yes
##       3.002525253       3.735087719
```

```r
cohens_d(Sim_mean ~ Neurotype, data = h1.means)
```

```
## Cohen's d |         95% CI
## -------------------------
## -1.13     | [-1.47, -0.79]
##
## - Estimated using pooled SD.
```

Enjoyment

```r
t.test(Enjoy_mean ~ Neurotype, data = h1.means, conf.level = 0.9917) %>%
  print(digits = 10)
```

```
##
##  Welch Two Sample t-test
##
## data:  Enjoy_mean by Neurotype
## t = -0.94546828, df = 133.62169, p-value = 0.3461264
## alternative hypothesis: true difference in means between group No and group Yes is not equal to 0
## 99.17 percent confidence interval:
##  -0.4033991875  0.1929703375
## sample estimates:
##  mean in group No mean in group Yes
##       3.648148148       3.753362573
```

```r
cohens_d(Enjoy_mean ~ Neurotype, data = h1.means)
```

```
## Cohen's d |        95% CI
## -------------------------
## -0.15     | [-0.47, 0.16]
##
## - Estimated using pooled SD.
```

Instrumental Aid

```r
t.test(Aid_mean ~ Neurotype, data = h1.means, conf.level = 0.9917) %>%
  print(digits = 10)
```

```
##
##  Welch Two Sample t-test
##
## data:  Aid_mean by Neurotype
## t = -1.357255, df = 156.85169, p-value = 0.17665
## alternative hypothesis: true difference in means between group No and group Yes is not equal to 0
## 99.17 percent confidence interval:
##  -0.4231314018  0.1381765905
## sample estimates:
##  mean in group No mean in group Yes
##       2.217171717       2.359649123
```

```r
cohens_d(Aid_mean ~ Neurotype, data = h1.means)
```

```
## Cohen's d |        95% CI
## -------------------------
## -0.21     | [-0.52, 0.11]
##
## - Estimated using pooled SD.
```

Communion

```r
t.test(Commu_mean ~ Neurotype, data = h1.means, conf.level = 0.9917) %>%
  print(digits = 10)
```

```
##
##  Welch Two Sample t-test
##
## data:  Commu_mean by Neurotype
## t = -1.5606176, df = 148.45079, p-value = 0.1207433
## alternative hypothesis: true difference in means between group No and group Yes is not equal to 0
## 99.17 percent confidence interval:
##  -0.6227890245  0.1639069709
## sample estimates:
##  mean in group No mean in group Yes
##       3.327200577       3.556641604
```

```r
  cohens_d(Commu_mean ~ Neurotype, data = h1.means)
```

```
## Cohen's d |        95% CI
## -------------------------
## -0.25     | [-0.56, 0.07]
##
## - Estimated using pooled SD.
```

H1 - Visualise Data

```r
factor_names <- c(
  SymRec = "Symmetrical Reciprocity*",
  Age = "Agency",
  Sim = "Similarity**",
  Enjoy = "Enjoyment",
  Aid = "Instrumental Aid",
  Commu = "Communion"
)

h1.long <- h1.means %>%
  mutate(Neurotype = factor(Neurotype, levels = c("Yes", "No"), labels = c("Autistic", "Non-autistic")))
  pivot_longer(
```

```
    cols = ends_with("_mean"),
    names_to = "Factor",
    values_to = "MeanScore"
  ) %>%
  mutate(
    Factor = gsub("_mean", "", Factor),
    Factor = factor(Factor, levels = names(factor_names), labels = factor_names)
  )

ggplot(h1.long, aes(x = Neurotype, y = MeanScore, fill = Neurotype)) +
  geom_violin(trim = FALSE, alpha = 0.6, colour = NA) +
  stat_summary(fun = mean, geom = "point", shape = 21, size = 3, fill = "black") +
  geom_jitter(width = 0.1, size = 1, alpha = 0.5) +
  scale_fill_manual(values = c("Autistic" = "#FF6F61", "Non-autistic" = "#6BAED6")) +
  facet_wrap(~ Factor, scales = "free_y") +
  labs(
    title = "Mean Scores by Neurotype Across Friendship Expectation Factors",
    x = "Neurotype",
    y = "Mean Score"
  ) +
  theme_classic()
```

