

# Hypothesis Testing Code

Anonymous

2026-02-25

```
source("/workspace/src/R/utils.r")
```

## RQ1: Actual and Perceived Performance

```
p.1 <- (pretty_wcbs_df(data$s1, "superscore", round = FALSE) %>% pull(p))[2]
p.2 <- (pretty_wcbs_df(data$s1.duplicated, "self_grade", round = FALSE) %>% pull(p))[2]

p.multiple <- c(p.1, p.2)
p.multiple.adjusted <- p.adjust(p.multiple, method = "BH")
p.multiple.adjusted

x <- rbind(
  pretty_wcbs_df(data$s1, "superscore"),
  pretty_wcbs_df(data$s1.duplicated, "self_grade")
)
x$p_adj <- c(
  "", scales::pvalue(p.multiple.adjusted[1]),
  "", p.multiple.adjusted[2]
)
x <- colswap_p_adj_g(x)
x %>% texify("perf_results")
```

```
x
```

```
##      Variable      B CRSE   LL   UL      p  p_adj      g
## 1      Constant  74.30  5.08 62.67 84.05 <0.001
## 2 with_ai = True  14.09  3.96  6.46 22.89 <0.001 <0.001  0.99
## 3      Constant  11.18  0.43 10.20 12.06 <0.001
## 4 with_ai = True  -0.23  0.27 -0.80  0.34  0.435  0.435 -0.13
```

## RQ2: Learning Retention

```
data$s2$superscore_delta <- data$s2$superscore - data$s2$original_superscore
p.1 <- (pretty_wcbs_df(data$s2, "superscore_delta", "previously_with_ai", round = FALSE) %>% pull(p))[2]
p.2 <- (pretty_wcbs_df(data$s2, "superscore", "previously_with_ai", round = FALSE) %>% pull(p))[2]
p.4 <- ((pretty_wcbs_df(filter(data$s2, stronger), "superscore", "previously_with_ai", round = FALSE) %>% pull(p))[2])
p.3 <- ((pretty_wcbs_df(filter(data$s2, !stronger), "superscore", "previously_with_ai", round = FALSE) %>% pull(p))[2])

p.multiple <- c(p.1, p.2, p.3, p.4)
p.multiple
p.multiple.adjusted <- p.adjust(p.multiple, method = "BH")
p.multiple.adjusted <- p.multiple.adjusted %>% scales::pvalue()

x <- rbind(
  pretty_wcbs_df(data$s2, "superscore_delta", "previously_with_ai"),
  pretty_wcbs_df(data$s2, "superscore", "previously_with_ai"),
  pretty_wcbs_df(filter(data$s2, !stronger), "superscore", "previously_with_ai"),
  pretty_wcbs_df(filter(data$s2, stronger), "superscore", "previously_with_ai")
)
x$p_adj <- c(
  "", p.multiple.adjusted[1],
  "", p.multiple.adjusted[2],
  "", p.multiple.adjusted[3],
  "", p.multiple.adjusted[4]
)
x <- colswap_p_adj_g(x)
x %>% texify("learning_results")
```

```
x
```

```
##           Variable      B CRSE    LL    UL      p p_adj    g
## 1           Constant -2.65  6.03 -15.74 10.34  0.664
## 2 previously_with_ai = True -18.88  6.33 -32.87 -5.01  0.015 0.054 -1.13
## 3           Constant  71.65  5.58  59.40 83.81 <0.001
## 4 previously_with_ai = True  -4.79  5.58 -16.86  7.46  0.397 0.529 -0.27
## 5           Constant  55.01 10.42  31.87 77.38  0.001
## 6 previously_with_ai = True  -6.18 11.52 -30.46 18.96  0.606 0.606 -0.20
## 7           Constant  88.29  2.74  82.35 92.39 <0.001
## 8 previously_with_ai = True  -3.40  1.57  -6.88 -0.40  0.027 0.054 -0.28
```

## RQ3: Workload

```
p.1 <- (pretty_wcbs_df(data$s1.duplicated, "tlx_mental", round = FALSE) %>% pull(p))[2]
p.2 <- (pretty_wcbs_df(data$s1.duplicated, "tlx_temporal", round = FALSE) %>% pull(p))[2]
p.3 <- (pretty_wcbs_df(data$s1.duplicated, "tlx_effort", round = FALSE) %>% pull(p))[2]
p.4 <- (pretty_wcbs_df(data$s1.duplicated, "tlx_frustration", round = FALSE) %>% pull(p))[2]
p.multiple <- c(p.1, p.2, p.3, p.4)
p.multiple.adjusted <- p.adjust(p.multiple, method = "BH")
p.multiple.adjusted
x <- rbind(
  pretty_wcbs_df(data$s1.duplicated, "tlx_mental"),
  pretty_wcbs_df(data$s1.duplicated, "tlx_temporal"),
  pretty_wcbs_df(data$s1.duplicated, "tlx_effort"),
  pretty_wcbs_df(data$s1.duplicated, "tlx_frustration")
)
x$p_adj <- c(
  "", scales::pvalue(p.multiple.adjusted[1]),
  "", p.multiple.adjusted[2],
  "", p.multiple.adjusted[3],
  "", scales::pvalue(p.multiple.adjusted[4])
)
x <- colswap_p_adj_g(x)
x %>% texify("tlx_results")
x
```

x

```
##      Variable      B CRSE      LL      UL      p p_adj      g
## 1      Constant  42.95  5.74  30.52  55.59 <0.001
## 2 with_ai = True -23.41  5.75 -36.42 -11.77  0.002 0.003 -1.22
## 3      Constant  50.23  7.17  34.54  65.97 <0.001
## 4 with_ai = True -29.09  6.63 -43.68 -14.53  0.001 0.002 -1.21
## 5      Constant  44.77  4.89  34.03  55.68 <0.001
## 6 with_ai = True -22.95  4.35 -32.85 -13.37  0.001 0.002 -1.28
## 7      Constant  17.05  4.55   7.16  27.14  0.001
## 8 with_ai = True  -3.64  4.84 -14.57   6.58  0.470 0.470 -0.24
```

## RQ4: Emotion

```
p.1 <- (pretty_wcbs_df(data$s1.duplicated, "valence_delta", round = FALSE) %>% pull(p))[2]
p.2 <- (pretty_wcbs_df(data$s1.duplicated, "arousal_delta", round = FALSE) %>% pull(p))[2]
p.multiple <- c(p.1, p.2)
p.multiple.adjusted <- p.adjust(p.multiple, method = "BH")
p.multiple.adjusted

x <- rbind(
  pretty_wcbs_df(data$s1.duplicated, "valence_delta"),
  pretty_wcbs_df(data$s1.duplicated, "arousal_delta")
)
x$p_adj <- c("", p.multiple.adjusted[1], "", p.multiple.adjusted[2])
x <- colswap_p_adj_g(x)
x %>% texify("emotion_results")
```

```
x
```

```
##      Variable      B CRSE   LL   UL      p p_adj      g
## 1      Constant  0.36 0.14  0.07  0.64  0.015
## 2 with_ai = True -1.18 0.31 -1.84 -0.52  0.001 0.002 -1.61
## 3      Constant  1.36 0.27  0.77  1.95 <0.001
## 4 with_ai = True -2.09 0.58 -3.37 -0.83  0.004 0.004 -1.74
```