**MTiS**

*Summary of linear model with MTiS as response variable and amount of documents + learning strategy as explanatory variable*

> summary(lm(MTiS~num\_doc + LS, all\_df\_long\_format))

Call:

lm(formula = MTiS ~ num\_doc + LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.109467 -0.030915 -0.004573 0.032236 0.097127

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 1.662e-01 2.306e-03 72.072 < 2e-16 \*\*\*

num\_doc001 3.851e-03 2.409e-03 1.599 0.110

num\_doc010 1.088e-02 2.409e-03 4.515 6.58e-06 \*\*\*

num\_doc050 2.332e-02 2.409e-03 9.682 < 2e-16 \*\*\*

num\_doc100 3.634e-02 2.409e-03 15.086 < 2e-16 \*\*\*

num\_doc500 1.192e-01 2.409e-03 49.477 < 2e-16 \*\*\*

LS1 8.023e-04 2.409e-03 0.333 0.739

LS2 2.215e-03 2.409e-03 0.920 0.358

LS3 8.001e-05 2.409e-03 0.033 0.974

LS4 -3.600e-03 2.409e-03 -1.495 0.135

LSmixed -1.309e-04 2.409e-03 -0.054 0.957

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.03732 on 2869 degrees of freedom

Multiple R-squared: 0.5451, Adjusted R-squared: 0.5435

F-statistic: 343.8 on 10 and 2869 DF, p-value: < 2.2e-16

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*Summary of linear model with MTiS as response variable and amount of documents as explanatory variable*

> summary(lm(MTiS~num\_doc,data=all\_df\_long\_format))

Call:

lm(formula = MTiS ~ num\_doc, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.10856 -0.03076 -0.00516 0.03250 0.09731

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.166103 0.001704 97.501 < 2e-16 \*\*\*

num\_doc001 0.003851 0.002409 1.598 0.11

num\_doc010 0.010876 0.002409 4.514 6.61e-06 \*\*\*

num\_doc050 0.023320 0.002409 9.679 < 2e-16 \*\*\*

num\_doc100 0.036338 0.002409 15.083 < 2e-16 \*\*\*

num\_doc500 0.119175 0.002409 49.465 < 2e-16 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.03732 on 2874 degrees of freedom

Multiple R-squared: 0.5441, Adjusted R-squared: 0.5433

F-statistic: 686.1 on 5 and 2874 DF, p-value: < 2.2e-16

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*Summary of linear model with MTiS as response variable and learning strategy as explanatory variable*

> summary(lm(MTiS~LS,data=all\_df\_long\_format))

Call:

lm(formula = MTiS ~ LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.089408 -0.044857 -0.003634 0.025109 0.184042

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 1.985e-01 2.522e-03 78.698 <2e-16 \*\*\*

LS1 8.023e-04 3.566e-03 0.225 0.822

LS2 2.215e-03 3.566e-03 0.621 0.535

LS3 8.001e-05 3.566e-03 0.022 0.982

LS4 -3.600e-03 3.566e-03 -1.009 0.313

LSmixed -1.309e-04 3.566e-03 -0.037 0.971

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.05525 on 2874 degrees of freedom

Multiple R-squared: 0.001009, Adjusted R-squared: -0.0007286

F-statistic: 0.5808 on 5 and 2874 DF, p-value: 0.7148

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*Summary of linear model with MTiS as response variable and skill tree as explanatory variable*

> summary(lm(MTiS~skill\_tree,data=all\_df\_long\_format))

Call:

lm(formula = MTiS ~ skill\_tree, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.071432 -0.025401 -0.013149 0.004487 0.149860

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.232730 0.001139 204.25 <2e-16 \*\*\*

skill\_tree4\_9 -0.068735 0.001611 -42.66 <2e-16 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.04324 on 2878 degrees of freedom

Multiple R-squared: 0.3873, Adjusted R-squared: 0.3871

F-statistic: 1819 on 1 and 2878 DF, p-value: < 2.2e-16

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*Pairwise comparisons MTiS of different learning strategy conditions within zero-document condition*

>pairs(emmeans(lm(MTiS~LS,data=all\_df\_long\_format[all\_df\_long\_format$num\_doc=="000",]),spec=c("LS")))

contrast estimate SE df t.ratio p.value

0 - 1 -0.008470 0.00432 474 -1.961 0.3664

0 - 2 -0.012485 0.00432 474 -2.891 0.0461

0 - 3 -0.003417 0.00432 474 -0.791 0.9690

0 - 4 0.019046 0.00432 474 4.410 0.0002

0 - mixed 0.000851 0.00432 474 0.197 1.0000

1 - 2 -0.004015 0.00432 474 -0.930 0.9388

1 - 3 0.005053 0.00432 474 1.170 0.8510

1 - 4 0.027516 0.00432 474 6.371 <.0001

1 - mixed 0.009322 0.00432 474 2.158 0.2595

2 - 3 0.009068 0.00432 474 2.100 0.2892

2 - 4 0.031531 0.00432 474 7.300 <.0001

2 - mixed 0.013336 0.00432 474 3.088 0.0259

3 - 4 0.022463 0.00432 474 5.201 <.0001

3 - mixed 0.004268 0.00432 474 0.988 0.9216

4 - mixed -0.018194 0.00432 474 -4.213 0.0004

P value adjustment: tukey method for comparing a family of 6 estimates

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*Pairwise comparisons MTiS of different document conditions*

>pairs(emmeans(lm(MTiS~num\_doc+LS,data=all\_df\_long\_format),spec=c("num\_doc")))

contrast estimate SE df t.ratio p.value

num\_doc000 - num\_doc001 -0.00385 0.00241 2869 -1.599 0.5995

num\_doc000 - num\_doc010 -0.01088 0.00241 2869 -4.515 0.0001

num\_doc000 - num\_doc050 -0.02332 0.00241 2869 -9.682 <.0001

num\_doc000 - num\_doc100 -0.03634 0.00241 2869 -15.086 <.0001

num\_doc000 - num\_doc500 -0.11917 0.00241 2869 -49.477 <.0001

num\_doc001 - num\_doc010 -0.00703 0.00241 2869 -2.917 0.0415

num\_doc001 - num\_doc050 -0.01947 0.00241 2869 -8.083 <.0001

num\_doc001 - num\_doc100 -0.03249 0.00241 2869 -13.488 <.0001

num\_doc001 - num\_doc500 -0.11532 0.00241 2869 -47.879 <.0001

num\_doc010 - num\_doc050 -0.01244 0.00241 2869 -5.166 <.0001

num\_doc010 - num\_doc100 -0.02546 0.00241 2869 -10.571 <.0001

num\_doc010 - num\_doc500 -0.10830 0.00241 2869 -44.962 <.0001

num\_doc050 - num\_doc100 -0.01302 0.00241 2869 -5.405 <.0001

num\_doc050 - num\_doc500 -0.09585 0.00241 2869 -39.795 <.0001

num\_doc100 - num\_doc500 -0.08284 0.00241 2869 -34.391 <.0001

Results are averaged over the levels of: LS

P value adjustment: tukey method for comparing a family of 6 estimates

**MTA**

*Summary of linear model with MTA as response variable and amount of documents + learning strategy as explanatory variable*

> summary(lm(MTA~num\_doc+LS, all\_df\_long\_format))

Call:

lm(formula = MTA ~ num\_doc + LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.057250 -0.026558 -0.004555 0.027650 0.052948

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 1.663e-01 1.726e-03 96.338 < 2e-16 \*\*\*

num\_doc001 3.468e-03 1.803e-03 1.924 0.05449 .

num\_doc010 7.781e-03 1.803e-03 4.317 1.64e-05 \*\*\*

num\_doc050 7.712e-03 1.803e-03 4.278 1.94e-05 \*\*\*

num\_doc100 5.087e-03 1.803e-03 2.822 0.00481 \*\*

num\_doc500 -2.105e-02 1.803e-03 -11.676 < 2e-16 \*\*\*

LS1 1.010e-03 1.803e-03 0.560 0.57526

LS2 2.022e-03 1.803e-03 1.122 0.26209

LS3 1.645e-05 1.803e-03 0.009 0.99272

LS4 -3.553e-03 1.803e-03 -1.971 0.04879 \*

LSmixed -4.561e-04 1.803e-03 -0.253 0.80026

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.02793 on 2869 degrees of freedom

Multiple R-squared: 0.1169, Adjusted R-squared: 0.1138

F-statistic: 37.99 on 10 and 2869 DF, p-value: < 2.2e-16

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*Summary of linear model with MTA as response variable and amount of documents as explanatory variable*

> summary(lm(MTA~num\_doc,data=all\_df\_long\_format))

Call:

lm(formula = MTA ~ num\_doc, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.06064 -0.02639 -0.00516 0.02774 0.05513

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.166103 0.001276 130.182 < 2e-16 \*\*\*

num\_doc001 0.003468 0.001804 1.922 0.05474 .

num\_doc010 0.007781 0.001804 4.312 1.67e-05 \*\*\*

num\_doc050 0.007712 0.001804 4.274 1.98e-05 \*\*\*

num\_doc100 0.005087 0.001804 2.819 0.00485 \*\*

num\_doc500 -0.021046 0.001804 -11.664 < 2e-16 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.02795 on 2874 degrees of freedom

Multiple R-squared: 0.1136, Adjusted R-squared: 0.112

F-statistic: 73.63 on 5 and 2874 DF, p-value: < 2.2e-16

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*Summary of linear model with MTA as response variable and learning strategy as explanatory variable*

> summary(lm(MTA~LS,data=all\_df\_long\_format))

Call:

lm(formula = MTA ~ LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.06951 -0.02379 -0.01045 0.03080 0.05245

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 1.668e-01 1.353e-03 123.263 <2e-16 \*\*\*

LS1 1.010e-03 1.913e-03 0.528 0.5976

LS2 2.022e-03 1.913e-03 1.057 0.2907

LS3 1.645e-05 1.913e-03 0.009 0.9931

LS4 -3.553e-03 1.913e-03 -1.857 0.0634 .

LSmixed -4.561e-04 1.913e-03 -0.238 0.8116

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.02964 on 2874 degrees of freedom

Multiple R-squared: 0.00337, Adjusted R-squared: 0.001636

F-statistic: 1.944 on 5 and 2874 DF, p-value: 0.08396

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*Summary of linear model with MTA as response variable and skill tree as explanatory variable*

> summary(lm(MTA~skill\_tree,data=all\_df\_long\_format))

Call:

lm(formula = MTA ~ skill\_tree, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.047584 -0.004999 0.003391 0.008869 0.027756

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.1934772 0.0003308 584.9 <2e-16 \*\*\*

skill\_tree4\_9 -0.0537490 0.0004678 -114.9 <2e-16 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.01255 on 2878 degrees of freedom

Multiple R-squared: 0.821, Adjusted R-squared: 0.8209

F-statistic: 1.32e+04 on 1 and 2878 DF, p-value: < 2.2e-16

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*Pairwise comparisons MTA of different document conditions*

> pairs(emmeans(lm(MTA~num\_doc+LS,data=all\_df\_long\_format),spec=c("num\_doc")))

contrast estimate SE df t.ratio p.value

num\_doc000 - num\_doc001 -3.47e-03 0.0018 2869 -1.924 0.3877

num\_doc000 - num\_doc010 -7.78e-03 0.0018 2869 -4.317 0.0002

num\_doc000 - num\_doc050 -7.71e-03 0.0018 2869 -4.278 0.0003

num\_doc000 - num\_doc100 -5.09e-03 0.0018 2869 -2.822 0.0543

num\_doc000 - num\_doc500 2.10e-02 0.0018 2869 11.676 <.0001

num\_doc001 - num\_doc010 -4.31e-03 0.0018 2869 -2.393 0.1590

num\_doc001 - num\_doc050 -4.24e-03 0.0018 2869 -2.355 0.1728

num\_doc001 - num\_doc100 -1.62e-03 0.0018 2869 -0.898 0.9470

num\_doc001 - num\_doc500 2.45e-02 0.0018 2869 13.599 <.0001

num\_doc010 - num\_doc050 6.86e-05 0.0018 2869 0.038 1.0000

num\_doc010 - num\_doc100 2.69e-03 0.0018 2869 1.495 0.6678

num\_doc010 - num\_doc500 2.88e-02 0.0018 2869 15.992 <.0001

num\_doc050 - num\_doc100 2.63e-03 0.0018 2869 1.457 0.6920

num\_doc050 - num\_doc500 2.88e-02 0.0018 2869 15.954 <.0001

num\_doc100 - num\_doc500 2.61e-02 0.0018 2869 14.498 <.0001

Results are averaged over the levels of: LS

P value adjustment: tukey method for comparing a family of 6 estimates

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*Pairwise comparisons MTA of different learning strategy conditions within zero-document condition*

>pairs(emmeans(lm(MTA~LS,data=all\_df\_long\_format[all\_df\_long\_format$num\_doc=="000",]),spec=c("LS")))

contrast estimate SE df t.ratio p.value

0 - 1 -0.008470 0.00432 474 -1.961 0.3664

0 - 2 -0.012485 0.00432 474 -2.891 0.0461

0 - 3 -0.003417 0.00432 474 -0.791 0.9690

0 - 4 0.019046 0.00432 474 4.410 0.0002

0 - mixed 0.000851 0.00432 474 0.197 1.0000

1 - 2 -0.004015 0.00432 474 -0.930 0.9388

1 - 3 0.005053 0.00432 474 1.170 0.8510

1 - 4 0.027516 0.00432 474 6.371 <.0001

1 - mixed 0.009322 0.00432 474 2.158 0.2595

2 - 3 0.009068 0.00432 474 2.100 0.2892

2 - 4 0.031531 0.00432 474 7.300 <.0001

2 - mixed 0.013336 0.00432 474 3.088 0.0259

3 - 4 0.022463 0.00432 474 5.201 <.0001

3 - mixed 0.004268 0.00432 474 0.988 0.9216

4 - mixed -0.018194 0.00432 474 -4.213 0.0004

P value adjustment: tukey method for comparing a family of 6 estimates

**SLRSA**

*Summary of linear model with SLRSA as response variable and amount of documents + learning strategy as explanatory variable*

> summary(lm(SLRSA~num\_doc+LS,data=all\_df\_long\_format))

Call:

lm(formula = SLRSA ~ num\_doc + LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.113689 -0.047432 -0.004619 0.049058 0.092628

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.2992479 0.0030604 97.782 < 2e-16 \*\*\*

num\_doc001 0.0087796 0.0031964 2.747 0.00606 \*\*

num\_doc010 0.0215083 0.0031964 6.729 2.06e-11 \*\*\*

num\_doc050 0.0225049 0.0031964 7.041 2.39e-12 \*\*\*

num\_doc100 0.0171570 0.0031964 5.368 8.62e-08 \*\*\*

num\_doc500 -0.0373632 0.0031964 -11.689 < 2e-16 \*\*\*

LS1 0.0020477 0.0031964 0.641 0.52182

LS2 0.0040766 0.0031964 1.275 0.20228

LS3 0.0001648 0.0031964 0.052 0.95890

LS4 -0.0062361 0.0031964 -1.951 0.05116 .

LSmixed 0.0024411 0.0031964 0.764 0.44511

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.04952 on 2869 degrees of freedom

Multiple R-squared: 0.1519, Adjusted R-squared: 0.1489

F-statistic: 51.37 on 10 and 2869 DF, p-value: < 2.2e-16

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*Summary of linear model with SLRSA as response variable and amount of documents as explanatory variable*

> summary(lm(SLRSA~num\_doc,data=all\_df\_long\_format))

Call:

lm(formula = SLRSA ~ num\_doc, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.120341 -0.047483 -0.003022 0.049318 0.096289

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.299664 0.002263 132.405 < 2e-16 \*\*\*

num\_doc001 0.008780 0.003201 2.743 0.00612 \*\*

num\_doc010 0.021508 0.003201 6.720 2.18e-11 \*\*\*

num\_doc050 0.022505 0.003201 7.031 2.55e-12 \*\*\*

num\_doc100 0.017157 0.003201 5.360 8.96e-08 \*\*\*

num\_doc500 -0.037363 0.003201 -11.673 < 2e-16 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.04958 on 2874 degrees of freedom

Multiple R-squared: 0.1481, Adjusted R-squared: 0.1466

F-statistic: 99.94 on 5 and 2874 DF, p-value: < 2.2e-16

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*Summary of linear model with SLRSA as response variable and learning strategy as explanatory variable*

> summary(lm(SLRSA~LS,data=all\_df\_long\_format))

Call:

lm(formula = SLRSA ~ LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.13276 -0.03996 -0.01615 0.05703 0.08800

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.3046790 0.0024475 124.485 <2e-16 \*\*\*

LS1 0.0020477 0.0034613 0.592 0.5542

LS2 0.0040766 0.0034613 1.178 0.2390

LS3 0.0001648 0.0034613 0.048 0.9620

LS4 -0.0062361 0.0034613 -1.802 0.0717 .

LSmixed 0.0024411 0.0034613 0.705 0.4807

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.05362 on 2874 degrees of freedom

Multiple R-squared: 0.003741, Adjusted R-squared: 0.002008

F-statistic: 2.158 on 5 and 2874 DF, p-value: 0.05597

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*Summary of linear model with SLRSA as response variable and skill tree as explanatory variable*

> summary(lm(SLRSA~skill\_tree,data=all\_df\_long\_format))

Call:

lm(formula = SLRSA ~ skill\_tree, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.083448 -0.010445 0.008743 0.017227 0.047106

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.3527776 0.0006492 543.4 <2e-16 \*\*\*

skill\_tree4\_9 -0.0953658 0.0009181 -103.9 <2e-16 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.02464 on 2878 degrees of freedom

Multiple R-squared: 0.7894, Adjusted R-squared: 0.7894

F-statistic: 1.079e+04 on 1 and 2878 DF, p-value: < 2.2e-16

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*Pairwise comparisons SLRSA of different document conditions*

> pairs(emmeans(lm(SLRSA~num\_doc+LS,data=all\_df\_long\_format),spec=c("num\_doc")))

contrast estimate SE df t.ratio p.value

num\_doc000 - num\_doc001 -0.008780 0.0032 2869 -2.747 0.0667

num\_doc000 - num\_doc010 -0.021508 0.0032 2869 -6.729 <.0001

num\_doc000 - num\_doc050 -0.022505 0.0032 2869 -7.041 <.0001

num\_doc000 - num\_doc100 -0.017157 0.0032 2869 -5.368 <.0001

num\_doc000 - num\_doc500 0.037363 0.0032 2869 11.689 <.0001

num\_doc001 - num\_doc010 -0.012729 0.0032 2869 -3.982 0.0010

num\_doc001 - num\_doc050 -0.013725 0.0032 2869 -4.294 0.0003

num\_doc001 - num\_doc100 -0.008377 0.0032 2869 -2.621 0.0925

num\_doc001 - num\_doc500 0.046143 0.0032 2869 14.436 <.0001

num\_doc010 - num\_doc050 -0.000997 0.0032 2869 -0.312 0.9996

num\_doc010 - num\_doc100 0.004351 0.0032 2869 1.361 0.7502

num\_doc010 - num\_doc500 0.058872 0.0032 2869 18.418 <.0001

num\_doc050 - num\_doc100 0.005348 0.0032 2869 1.673 0.5498

num\_doc050 - num\_doc500 0.059868 0.0032 2869 18.730 <.0001

num\_doc100 - num\_doc500 0.054520 0.0032 2869 17.057 <.0001

Results are averaged over the levels of: LS

P value adjustment: tukey method for comparing a family of 6 estimates

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*Pairwise comparisons SLRSA of different learning strategy conditions within zero-document condition*

>pairs(emmeans(lm(SLRSA~LS,data=all\_df\_long\_format[all\_df\_long\_format$num\_doc=="000",]),spec=c("LS")))

contrast estimate SE df t.ratio p.value

0 - 1 -0.017254 0.0074 474 -2.332 0.1832

0 - 2 -0.025298 0.0074 474 -3.420 0.0089

0 - 3 -0.005667 0.0074 474 -0.766 0.9730

0 - 4 0.034755 0.0074 474 4.698 0.0001

0 - mixed -0.000187 0.0074 474 -0.025 1.0000

1 - 2 -0.008044 0.0074 474 -1.087 0.8864

1 - 3 0.011587 0.0074 474 1.566 0.6212

1 - 4 0.052009 0.0074 474 7.031 <.0001

1 - mixed 0.017066 0.0074 474 2.307 0.1932

2 - 3 0.019631 0.0074 474 2.654 0.0868

2 - 4 0.060052 0.0074 474 8.118 <.0001

2 - mixed 0.025110 0.0074 474 3.394 0.0097

3 - 4 0.040421 0.0074 474 5.464 <.0001

3 - mixed 0.005479 0.0074 474 0.741 0.9767

4 - mixed -0.034942 0.0074 474 -4.723 <.0001

P value adjustment: tukey method for comparing a family of 6 estimates

**RMSLPA**

*Summary of linear model with RMSLPA as response variable and amount of documents + learning strategy as explanatory variable*

> summary(lm(RMSLPA~num\_doc+LS,data=all\_df\_long\_format))

Call:

lm(formula = RMSLPA ~ num\_doc + LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.36764 -0.14799 0.00344 0.14344 0.44396

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.6812151 0.0101543 67.087 < 2e-16 \*\*\*

num\_doc001 -0.0232344 0.0106058 -2.191 0.028551 \*

num\_doc010 -0.0226159 0.0106058 -2.132 0.033058 \*

num\_doc050 -0.0262078 0.0106058 -2.471 0.013528 \*

num\_doc100 -0.0280743 0.0106058 -2.647 0.008164 \*\*

num\_doc500 -0.0531971 0.0106058 -5.016 5.6e-07 \*\*\*

LS1 0.0025339 0.0106058 0.239 0.811185

LS2 0.0021086 0.0106058 0.199 0.842420

LS3 0.0007268 0.0106058 0.069 0.945367

LS4 0.0208321 0.0106058 1.964 0.049601 \*

LSmixed 0.0393166 0.0106058 3.707 0.000214 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.1643 on 2869 degrees of freedom

Multiple R-squared: 0.01654, Adjusted R-squared: 0.01311

F-statistic: 4.825 on 10 and 2869 DF, p-value: 6.43e-07

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*Summary of linear model with RMSLPA as response variable and amount of documents as explanatory variable*

> summary(lm(RMSLPA~num\_doc,data=all\_df\_long\_format))

Call:

lm(formula = RMSLPA ~ num\_doc, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.37856 -0.14849 0.00304 0.14162 0.47236

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.692135 0.007522 92.009 < 2e-16 \*\*\*

num\_doc001 -0.023234 0.010638 -2.184 0.02904 \*

num\_doc010 -0.022616 0.010638 -2.126 0.03360 \*

num\_doc050 -0.026208 0.010638 -2.464 0.01382 \*

num\_doc100 -0.028074 0.010638 -2.639 0.00836 \*\*

num\_doc500 -0.053197 0.010638 -5.001 6.06e-07 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.1648 on 2874 degrees of freedom

Multiple R-squared: 0.008764, Adjusted R-squared: 0.00704

F-statistic: 5.082 on 5 and 2874 DF, p-value: 0.0001212

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*Summary of linear model with RMSLPA as response variable and learning strategy as explanatory variable*

> summary(lm(RMSLPA~LS,data=all\_df\_long\_format))

Call:

lm(formula = RMSLPA ~ LS, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.38383 -0.14793 0.00274 0.14116 0.45544

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.6556602 0.0075262 87.117 < 2e-16 \*\*\*

LS1 0.0025339 0.0106437 0.238 0.811844

LS2 0.0021086 0.0106437 0.198 0.842973

LS3 0.0007268 0.0106437 0.068 0.945561

LS4 0.0208321 0.0106437 1.957 0.050417 .

LSmixed 0.0393166 0.0106437 3.694 0.000225 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.1649 on 2874 degrees of freedom

Multiple R-squared: 0.007776, Adjusted R-squared: 0.006049

F-statistic: 4.504 on 5 and 2874 DF, p-value: 0.0004306

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*Summary of linear model with RMSLPA as response variable and skill tree as explanatory variable*

> summary(lm(RMSLPA~skill\_tree,data=all\_df\_long\_format))

Call:

lm(formula = RMSLPA ~ skill\_tree, data = all\_df\_long\_format)

Residuals:

Min 1Q Median 3Q Max

-0.28517 -0.05283 -0.00436 0.05003 0.32566

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.812625 0.002045 397.4 <2e-16 \*\*\*

skill\_tree4\_9 -0.292090 0.002892 -101.0 <2e-16 \*\*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.07759 on 2878 degrees of freedom

Multiple R-squared: 0.78, Adjusted R-squared: 0.7799

F-statistic: 1.02e+04 on 1 and 2878 DF, p-value: < 2.2e-16

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*Pairwise comparisons RMSLPA of different document conditions*

> pairs(emmeans(lm(RMSLPA~num\_doc+LS,data=all\_df\_long\_format),spec=c("num\_doc")))

contrast estimate SE df t.ratio p.value

num\_doc000 - num\_doc001 0.023234 0.0106 2869 2.191 0.2423

num\_doc000 - num\_doc010 0.022616 0.0106 2869 2.132 0.2708

num\_doc000 - num\_doc050 0.026208 0.0106 2869 2.471 0.1331

num\_doc000 - num\_doc100 0.028074 0.0106 2869 2.647 0.0866

num\_doc000 - num\_doc500 0.053197 0.0106 2869 5.016 <.0001

num\_doc001 - num\_doc010 -0.000619 0.0106 2869 -0.058 1.0000

num\_doc001 - num\_doc050 0.002973 0.0106 2869 0.280 0.9998

num\_doc001 - num\_doc100 0.004840 0.0106 2869 0.456 0.9975

num\_doc001 - num\_doc500 0.029963 0.0106 2869 2.825 0.0538

num\_doc010 - num\_doc050 0.003592 0.0106 2869 0.339 0.9994

num\_doc010 - num\_doc100 0.005458 0.0106 2869 0.515 0.9956

num\_doc010 - num\_doc500 0.030581 0.0106 2869 2.883 0.0457

num\_doc050 - num\_doc100 0.001866 0.0106 2869 0.176 1.0000

num\_doc050 - num\_doc500 0.026989 0.0106 2869 2.545 0.1117

num\_doc100 - num\_doc500 0.025123 0.0106 2869 2.369 0.1676

Results are averaged over the levels of: LS

P value adjustment: tukey method for comparing a family of 6 estimates

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*Pairwise comparisons RMSLPA of different learning strategy conditions*

>pairs(emmeans(lm(RMSLPA~num\_doc+LS,data=all\_df\_long\_format),spec=c("LS")))

contrast estimate SE df t.ratio p.value

0 - 1 -0.002534 0.0106 2869 -0.239 0.9999

0 - 2 -0.002109 0.0106 2869 -0.199 1.0000

0 - 3 -0.000727 0.0106 2869 -0.069 1.0000

0 - 4 -0.020832 0.0106 2869 -1.964 0.3633

0 - mixed -0.039317 0.0106 2869 -3.707 0.0029

1 - 2 0.000425 0.0106 2869 0.040 1.0000

1 - 3 0.001807 0.0106 2869 0.170 1.0000

1 - 4 -0.018298 0.0106 2869 -1.725 0.5150

1 - mixed -0.036783 0.0106 2869 -3.468 0.0070

2 - 3 0.001382 0.0106 2869 0.130 1.0000

2 - 4 -0.018723 0.0106 2869 -1.765 0.4885

2 - mixed -0.037208 0.0106 2869 -3.508 0.0061

3 - 4 -0.020105 0.0106 2869 -1.896 0.4049

3 - mixed -0.038590 0.0106 2869 -3.639 0.0038

4 - mixed -0.018485 0.0106 2869 -1.743 0.5033

Results are averaged over the levels of: num\_doc

P value adjustment: tukey method for comparing a family of 6 estimates

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*Pairwise comparisons RMSLPA of different learning strategy conditions within zero-document condition*

>pairs(emmeans(lm(RMSLPA~LS,data=all\_df\_long\_format[all\_df\_long\_format$num\_doc=="000",]),spec=c("LS")))

contrast estimate SE df t.ratio p.value

0 - 1 -0.00755 0.0278 474 -0.271 0.9998

0 - 2 -0.01617 0.0278 474 -0.581 0.9922

0 - 3 0.01587 0.0278 474 0.570 0.9929

0 - 4 -0.12797 0.0278 474 -4.600 0.0001

0 - mixed -0.04538 0.0278 474 -1.631 0.5783

1 - 2 -0.00862 0.0278 474 -0.310 0.9996

1 - 3 0.02342 0.0278 474 0.842 0.9595

1 - 4 -0.12043 0.0278 474 -4.328 0.0003

1 - mixed -0.03783 0.0278 474 -1.360 0.7510

2 - 3 0.03204 0.0278 474 1.152 0.8593

2 - 4 -0.11180 0.0278 474 -4.018 0.0010

2 - mixed -0.02921 0.0278 474 -1.050 0.9006

3 - 4 -0.14385 0.0278 474 -5.170 <.0001

3 - mixed -0.06125 0.0278 474 -2.202 0.2389

4 - mixed 0.08259 0.0278 474 2.969 0.0369

P value adjustment: tukey method for comparing a family of 6 estimates