Supplementary materials for: Pointing models for users operating under different speed accuracy strategies

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1 Pairplot for the EMG parameters of the JGP dataset

Figure 1: ¡caption¿

2 Intraclass Correlation Coefficients (ICC) for the JGP dataset (Subsection 3.3)

2.1 Pearson's r

	Type	Description	ICC	F	df1	df2	pval	CI95%
0	ICC1	Single raters absolute	0.278121	2.541096	14	45	0.009083	[0.04 0.59]
1	ICC2	Single random raters	0.284798	2.679707	14	42	0.006876	[0.05 0.59]
2	ICC3	Single fixed raters	0.295738	2.679707	14	42	0.006876	[0.05 0.61]
3	ICC1k	Average raters absolute	0.606469	2.541096	14	45	0.009083	[0.15 0.85]
4	ICC2k	Average random raters	0.614320	2.679707	14	42	0.006876	[0.18 0.85]
5	ICC3k	Average fixed raters	0.626825	2.679707	14	42	0.006876	[0.18 0.86]

2.2 Spearman's ρ

	Type	Description	ICC	F	df1	df2	pval	CI95%
0	ICC1	Single raters absolute	0.269582	2.476315	14	45	0.010850	[0.03 0.58]
1	ICC2	Single random raters	0.272642	2.534710	14	42	0.010107	[0.04 0.58]
2	ICC3	Single fixed raters	0.277288	2.534710	14	42	0.010107	[0.04 0.59]
3	ICC1k	Average raters absolute	0.596174	2.476315	14	45	0.010850	[0.12 0.85]
4	ICC2k	Average random raters	0.599896	2.534710	14	42	0.010107	[0.14 0.85]
5	ICC3k	Average fixed raters	0.605478	2.534710	14	42	0.010107	[0.13 0.85]

2.3 Kendall's τ

	Type	Description	ICC	F	df1	df2	pval	CI95%
0	ICC1	Single raters absolute	0.289989	2.633714	14	45	0.007048	[0.05 0.6]
1	ICC2	Single random raters	0.291424	2.664110	14	42	0.007166	[0.05 0.6]
2	ICC3	Single fixed raters	0.293799	2.664110	14	42	0.007166	[0.05 0.6]
3	ICC1k	Average raters absolute	0.620308	2.633714	14	45	0.007048	[0.18 0.86]
4	ICC2k	Average random raters	0.621946	2.664110	14	42	0.007166	[0.18 0.86]
5	ICC3k	Average fixed raters	0.624640	2.664110	14	42	0.007166	[0.18 0.86]

Table 1: Mixed Linear Model Regression Results

Model:	MixedLM	Dependent Variable:	value
No. Observations:	180	Method:	REML
No. Groups:	14	Scale:	0.0096
Min. group size:	12	Log-Likelihood:	125.7111
Max. group size:	24	Converged:	Yes
Mean group size:	12.9		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.050	0.058	0.861	0.389	-0.063	0.162
D	0.000	0.000	1.065	0.287	-0.000	0.000
W	0.000	0.001	0.300	0.764	-0.001	0.001
D:W	-0.000	0.000	-1.707	0.088	-0.000	0.000
Group Var	0.001	0.006				

Table 2: Mixed Linear Model Regression Results

Model:	MixedLM	Dependent Variable:	value
No. Observations:	180	Method:	REML
No. Groups:	14	Scale:	0.0156
Min. group size:	12	Log-Likelihood:	87.4109
Max. group size:	24	Converged:	Yes
Mean group size:	12.9		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.064	0.073	0.882	0.378	-0.078	0.206
D	0.000	0.000	0.420	0.675	-0.000	0.000
W	-0.000	0.001	-0.169	0.866	-0.002	0.001
D:W	-0.000	0.000	-0.647	0.517	-0.000	0.000
Group Var	0.000	0.005				

Table 3: Mixed Linear Model Regression Results

Model:	MixedLM	Dependent Variable:	value
No. Observations:	180	Method:	REML
No. Groups:	14	Scale:	0.0107
Min. group size:	12	Log-Likelihood:	116.6185
Max. group size:	24	Converged:	No
Mean group size:	12.9		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.066	0.061	1.093	0.275	-0.053	0.185
D	0.000	0.000	0.820	0.412	-0.000	0.000
W	-0.000	0.001	-0.357	0.721	-0.001	0.001
D:W	-0.000	0.000	-0.926	0.354	-0.000	0.000
Group Var	0.001	0.008				

3 Effects of D and W on Pearson's r, Spearman's ρ and Kendall's τ

3.1 Effect of D and W on Pearson's r

3.2 Effect of D and W on Spearman's ρ

3.3 Effect of D and W on Kendall's τ

4 Effects of D and W on the t-copulas parameters

4.1 ρ

4.1.1 Effect of W

4.1.2 Effect of D

4.1.3 Effect of ID

4.2 ν

4.2.1 Effect of W

4.2.2 Effect of D

4.2.3 Effect of ID

Table 4: Mixed Linear Model Regression Results. Main effect W on ρ

Model:	MixedLM	Dependent Variable:	ρ
No. Observations:	170	Method:	REML
No. Groups:	15	Scale:	0.0493
Min. group size:	10	Log-Likelihood:	4.9045
Max. group size:	12	Converged:	No
Mean group size:	11.3		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	-0.115	0.066	-1.745	0.081	-0.245	0.014
W	0.001	0.001	1.597	0.110	-0.000	0.002
Group Var	0.001	0.013				

Table 5: Mixed Linear Model Regression Results. Main effect D on ρ

Model:	MixedLM	Dependent Variable:	ρ
No. Observations:	170	Method:	REML
No. Groups:	15	Scale:	0.0501
Min. group size:	10	Log-Likelihood:	0.7523
Max. group size:	12	Converged:	No
Mean group size:	11.3		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	-0.015	0.036	-0.421	0.674	-0.085	0.055
D	0.000	0.000	0.035	0.972	-0.000	0.000
Group Var	0.001	0.014				

Table 6: Mixed Linear Model Regression Results. Main effect ID on ρ

Model:	MixedLM	Dependent Variable:	ρ
No. Observations:	170	Method:	REML
No. Groups:	15	Scale:	0.0500
Min. group size:	10	Log-Likelihood:	7.1156
Max. group size:	12	Converged:	No
Mean group size:	11.3		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.017	0.062	0.267	0.790	-0.106	0.139
ID	-0.010	0.019	-0.514	0.607	-0.048	0.028
Group Var	0.001	0.014				

Table 7: Mixed Linear Model Regression Results. Main effect W on ρ

Model:	MixedLM	Dependent Variable:	ν
No. Observations:	170	Method:	REML
No. Groups:	15	Scale:	409148715.6844
Min. group size:	10	Log-Likelihood:	-1917.0449
Max. group size:	12	Converged:	No
Mean group size:	11.3		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	13196.476	6151.321	2.145	0.032	1140.109	25252.842
W	-56.842	60.155	-0.945	0.345	-174.744	61.060
Group Var	33506162.748	1171.304				

Table 8: Mixed Linear Model Regression Results. Main effect D on ρ

Model:	MixedLM	Dependent Variable:	ν
No. Observations:	170	Method:	REML
No. Groups:	15	Scale:	411033786.5680
Min. group size:	10	Log-Likelihood:	-1920.3093
Max. group size:	12	Converged:	No
Mean group size:	11.3		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	8376.120	3510.011	2.386	0.017	1496.624	15255.616
D	-0.788	3.491	-0.226	0.821	-7.631	6.055
Group Var	33954748.337	1186.523				

Table 9: Mixed Linear Model Regression Results. Main effect ID on ρ

Model:	MixedLM	Dependent Variable:	ν
No. Observations:	170	Method:	REML
No. Groups:	15	Scale:	411065779.3315
Min. group size:	10	Log-Likelihood:	-1914.0843
Max. group size:	12	Converged:	No
Mean group size:	11.3		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	6579.024	5816.890	1.131	0.258	-4821.870	17979.918
ID	384.267	1768.291	0.217	0.828	-3081.519	3850.053
Group Var	33916493.249	1184.884				

5 Number of successful fits for the copula fits per (D,W) pair

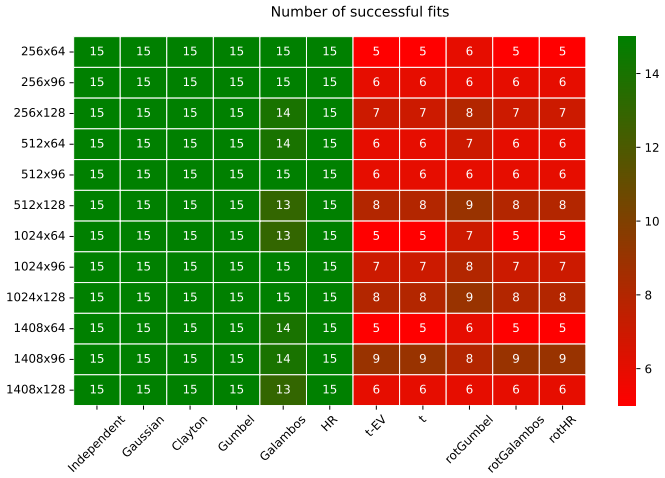

Figure 2: ¡caption¿

6 Fits for ID_e models as function of ID, W and D for the JGP dataset

Table 10: Mixed Linear Model Regression Results for ID_e on ID, W and D

Model:	MixedLM	Dependent Variable:	ide
No. Observations:	714	Method:	REML
No. Groups:	15	Scale:	0.0187
Min. group size:	46	Log-Likelihood:	391.8485
Max. group size:	48	Converged:	Yes
Mean group size:	47.6		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.262	0.313	0.838	0.402	-0.351	0.875
ID	0.846	0.115	7.331	0.000	0.620	1.072
w	-0.992	1.835	-0.541	0.589	-4.588	2.604
ID:w	-0.664	2.198	-0.302	0.763	-4.972	3.645
D	0.593	1.578	0.376	0.707	-2.499	3.686
ID:D	-0.042	0.202	-0.206	0.837	-0.438	0.355
w:D	5.022	5.825	0.862	0.389	-6.395	16.440
ID:w:D	-1.378	1.741	-0.791	0.429	-4.791	2.035
Group Var	0.001	0.004				

Table 11: Mixed Linear Model Regression Results for ID_e on ID and W

Model:	MixedLM	Dependent Variable:	ide
No. Observations:	714	Method:	REML
No. Groups:	15	Scale:	0.0187
Min. group size:	46	Log-Likelihood:	391.3947
Max. group size:	48	Converged:	Yes
Mean group size:	47.6		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.016	0.077	0.211	0.833	-0.134	0.167
ID	0.918	0.023	40.672	0.000	0.873	0.962
w	0.162	0.742	0.219	0.827	-1.291	1.616
ID:w	0.379	0.232	1.637	0.102	-0.075	0.833
Group Var	0.001	0.004				

Table 12: Mixed Linear Model Regression Results for ID_e on ID and D

Model:	MixedLM	Dependent Variable:	ide
No. Observations:	714	Method:	REML
No. Groups:	15	Scale:	0.0187
Min. group size:	46	Log-Likelihood:	386.7450
Max. group size:	48	Converged:	Yes
Mean group size:	47.6		

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.100	0.041	2.409	0.016	0.019	0.181
ID	0.890	0.017	51.507	0.000	0.856	0.924
D	0.296	0.067	4.423	0.000	0.165	0.427
ID:D	-0.040	0.018	-2.241	0.025	-0.076	-0.005
Group Var	0.001	0.004				

7 Association measures for the GO dataset (Subsection 4.3)

Table 13:

strategy	r	rho	tau
1	0.027881	0.034877	0.019789
2	0.111236	0.116360	0.085362
3	0.266716	0.262616	0.193317
4	0.093823	0.107219	0.077531
5	0.217365	0.226004	0.173897

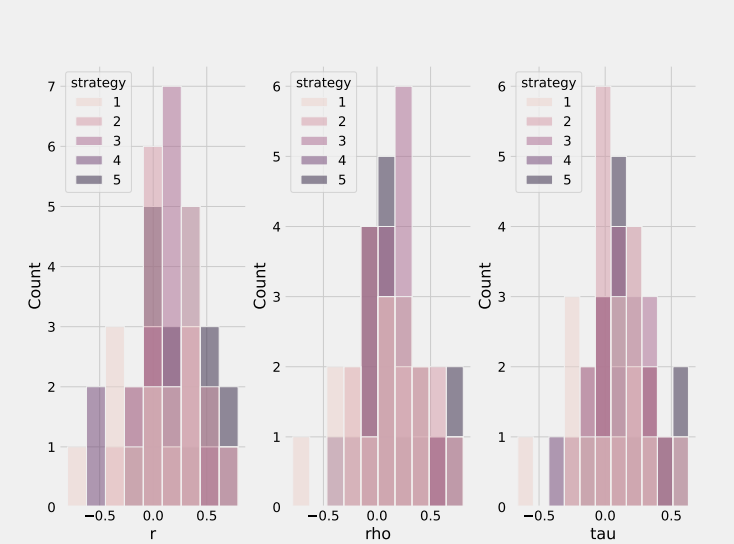

Figure 3: ¡caption¿

8 Pairplot for the EMG parameters for the GOP dataset

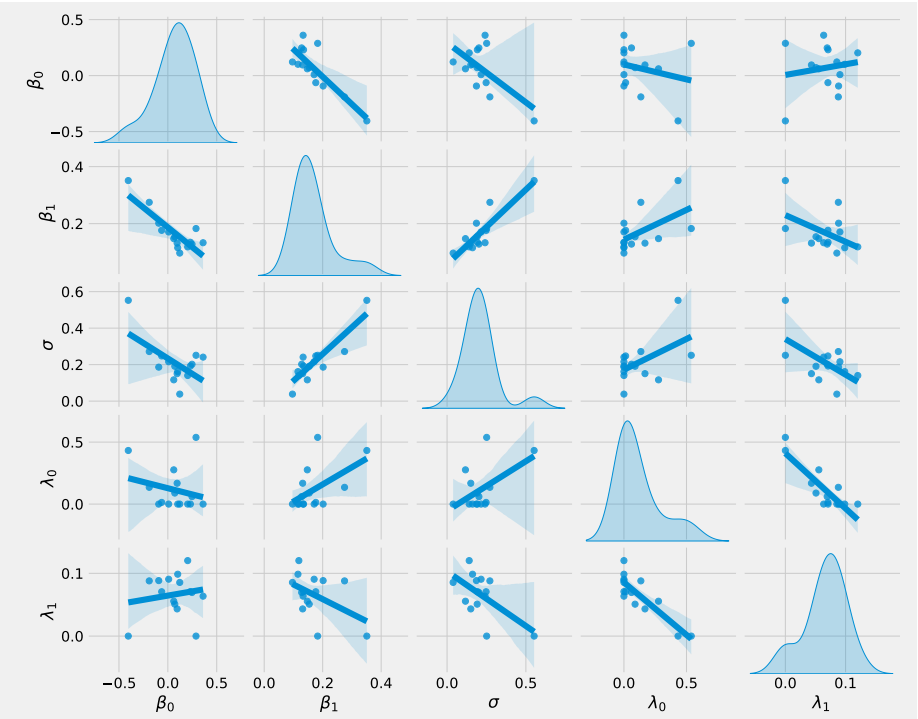

Figure 4: ¡caption¿

9 Linear fits for the Gaussian bivariate fit per strategy for the GO dataset (Subsection 4.5)

9.1 $\mu_i = \mathbf{const} + x_1\,\mathbf{strategy}$

Dep. Variable:	y	**R-squared:**	0.934
Model:	OLS	**Adj. R-squared:**	0.912
Method:	Least Squares	**F-statistic:**	42.58
Date:	Tue, 10 Sep 2024	**Prob (F-statistic):**	0.00731
Time:	16:31:51	**Log-Likelihood:**	3.4797
No. Observations:	5	**AIC:**	-2.959
Df Residuals:	3	**BIC:**	-3.741
Df Model:	1		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.2957	0.070	18.602	0.000	1.074	1.517
x1	0.6428	0.099	6.525	0.007	0.329	0.956

Omnibus:	nan	**Durbin-Watson:**	1.778
Prob(Omnibus):	nan	**Jarque-Bera (JB):**	0.441
Skew:	0.048	**Prob(JB):**	0.802
Kurtosis:	1.548	**Cond. No.**	1.41

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

9.2 $\mu_t = \mathbf{const} + x_1\,\mathbf{strategy}$

Dep. Variable:	y	**R-squared:**	0.934
Model:	OLS	**Adj. R-squared:**	0.912
Method:	Least Squares	**F-statistic:**	42.58
Date:	Tue, 10 Sep 2024	**Prob (F-statistic):**	0.00731
Time:	16:31:51	**Log-Likelihood:**	3.4797
No. Observations:	5	**AIC:**	-2.959
Df Residuals:	3	**BIC:**	-3.741
Df Model:	1		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.2957	0.070	18.602	0.000	1.074	1.517
x1	0.6428	0.099	6.525	0.007	0.329	0.956

Omnibus:	nan	**Durbin-Watson:**	1.778
Prob(Omnibus):	nan	**Jarque-Bera (JB):**	0.441
Skew:	0.048	**Prob(JB):**	0.802
Kurtosis:	1.548	**Cond. No.**	1.41

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

9.3 $\sigma_i = \text{const} + x_1$ strategy

Dep. Variable:	y	**R-squared:**	0.590
Model:	OLS	**Adj. R-squared:**	0.453
Method:	Least Squares	**F-statistic:**	4.317
Date:	Tue, 10 Sep 2024	**Prob (F-statistic):**	0.129
Time:	16:31:51	**Log-Likelihood:**	1.6774
No. Observations:	5	**AIC:**	0.6452
Df Residuals:	3	**BIC:**	-0.1360
Df Model:	1		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.0564	0.100	10.576	0.002	0.739	1.374
x1	0.2935	0.141	2.078	0.129	-0.156	0.743

Omnibus:	nan	**Durbin-Watson:**	1.799
Prob(Omnibus):	nan	**Jarque-Bera (JB):**	0.816
Skew:	-0.387	**Prob(JB):**	0.665
Kurtosis:	1.178	**Cond. No.**	1.41

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

9.4 $\sigma_t = \text{const} + x_1$ strategy

Dep. Variable:	y	**R-squared:**	0.681
Model:	OLS	**Adj. R-squared:**	0.574
Method:	Least Squares	**F-statistic:**	6.396
Date:	Tue, 10 Sep 2024	**Prob (F-statistic):**	0.0855
Time:	16:31:52	**Log-Likelihood:**	9.2180
No. Observations:	5	**AIC:**	-14.44
Df Residuals:	3	**BIC:**	-15.22
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P> |t|	[0.025	0.975]
const	0.3852	0.022	17.424	0.000	0.315	0.456
x1	0.0791	0.031	2.529	0.085	-0.020	0.179

Omnibus:	nan	**Durbin-Watson:**	1.787
Prob(Omnibus):	nan	**Jarque-Bera (JB):**	0.759
Skew:	0.358	**Prob(JB):**	0.684
Kurtosis:	1.231	**Cond. No.**	1.41

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

9.5 $\rho = \mathbf{const} + x_1$ strategy

Dep. Variable:	y	**R-squared:**	0.565
Model:	OLS	**Adj. R-squared:**	0.420
Method:	Least Squares	**F-statistic:**	3.896
Date:	Tue, 10 Sep 2024	**Prob (F-statistic):**	0.143
Time:	16:31:52	**Log-Likelihood:**	3.0488
No. Observations:	5	**AIC:**	-2.098
Df Residuals:	3	**BIC:**	-2.879
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P> |t|	[0.025	0.975]
const	0.3447	0.076	4.539	0.020	0.103	0.586
x1	0.2119	0.107	1.974	0.143	-0.130	0.554

Omnibus:	nan	**Durbin-Watson:**	1.648
Prob(Omnibus):	nan	**Jarque-Bera (JB):**	0.479
Skew:	0.485	**Prob(JB):**	0.787
Kurtosis:	1.833	**Cond. No.**	1.41

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

10 Violinplot for the Galambos Copula (GO dataset)

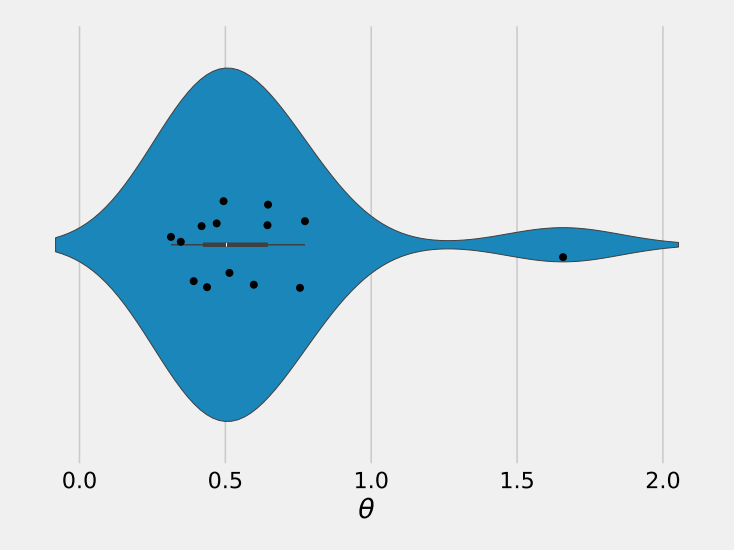

Figure 5: Parameter of the Galambos copula in the balanced condition in the GO dataset.

11 Parameters of the t-copula (GO dataset)

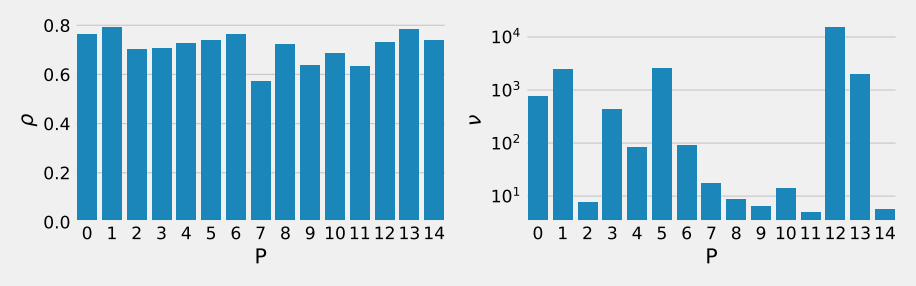

Figure 6: ¡caption¿

12 Parameter values for the Gaussian copula for the YORMK dataset

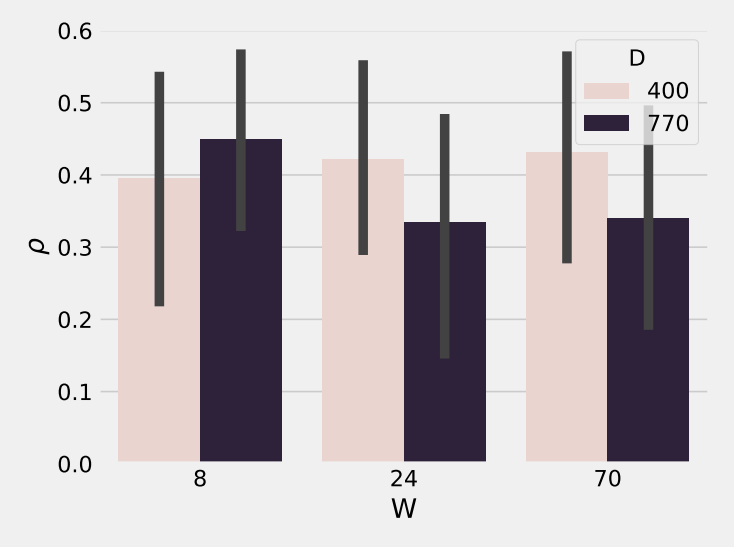

Figure 7: ¡caption¿

	Coef.	Std.Err.	z	P> |z|	[0.025	0.975]
Intercept	0.413	0.123	3.372	0.001	0.173	0.653
W	0.002	0.003	0.756	0.449	-0.003	0.007
D	-0.000	0.000	-0.033	0.974	-0.000	0.000
W:D	-0.000	0.000	-0.790	0.430	-0.000	0.000
Group Var	0.040	0.125				

Table 14: ¡caption¿

13 Correction on β_0 instead of λ_1 for Model 3 (Subsection 6.1)

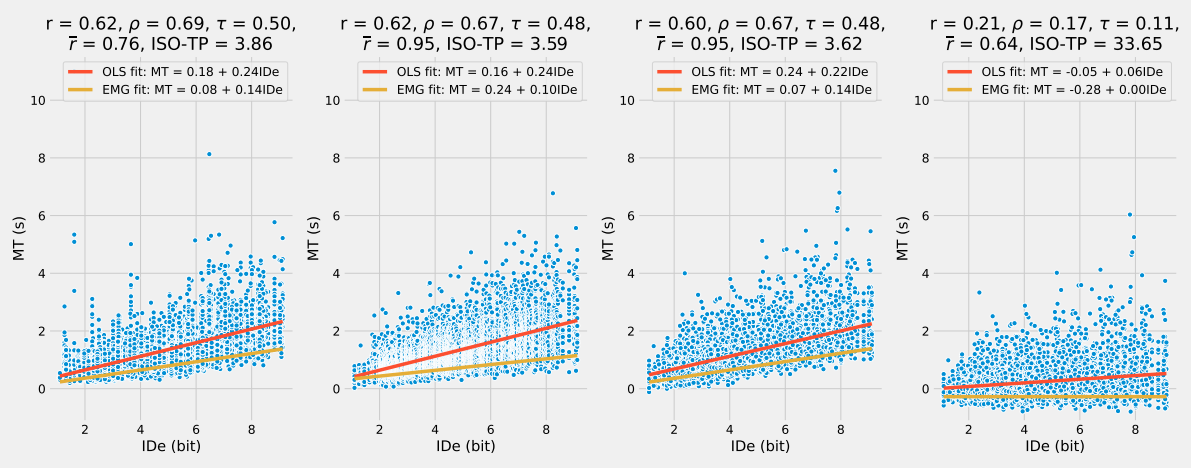

Figure 8: ¡caption¿

14 Replications of Figure 7 with different seeds (Subsection 6.1)

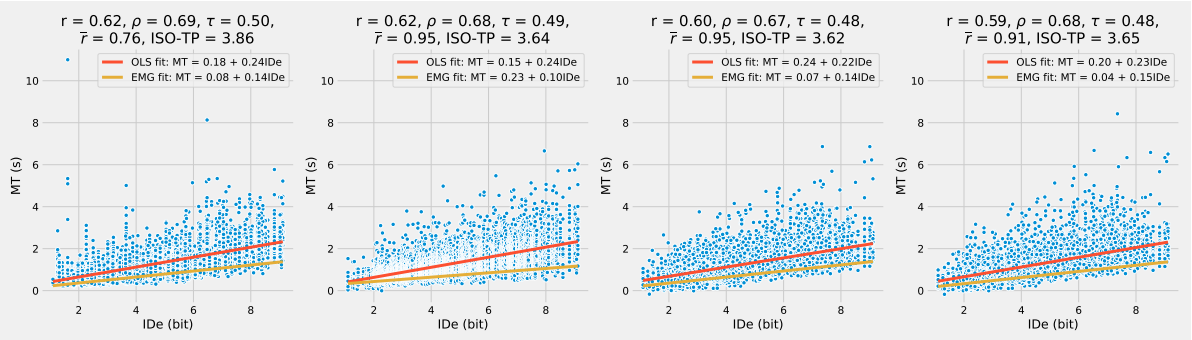

Figure 9: Seed = 777

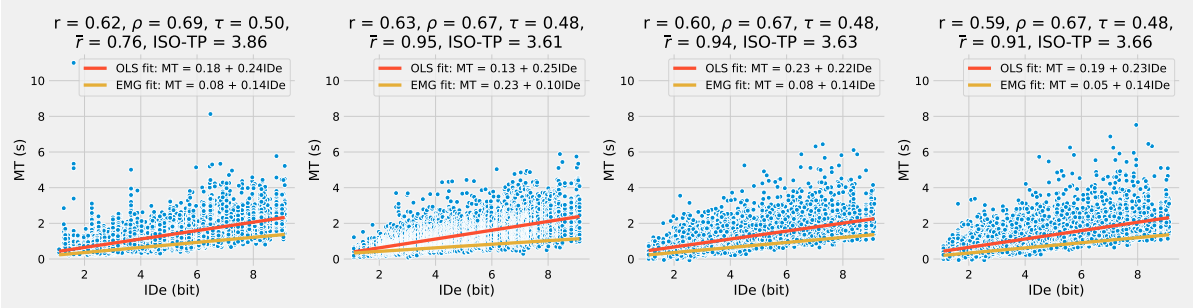

Figure 10: Seed = 999

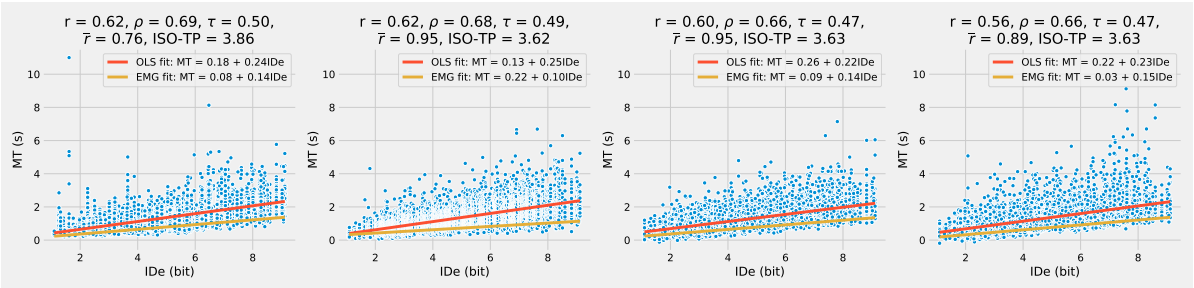

Figure 11: Seed = None

15 Participant internal consistency concerning strategies

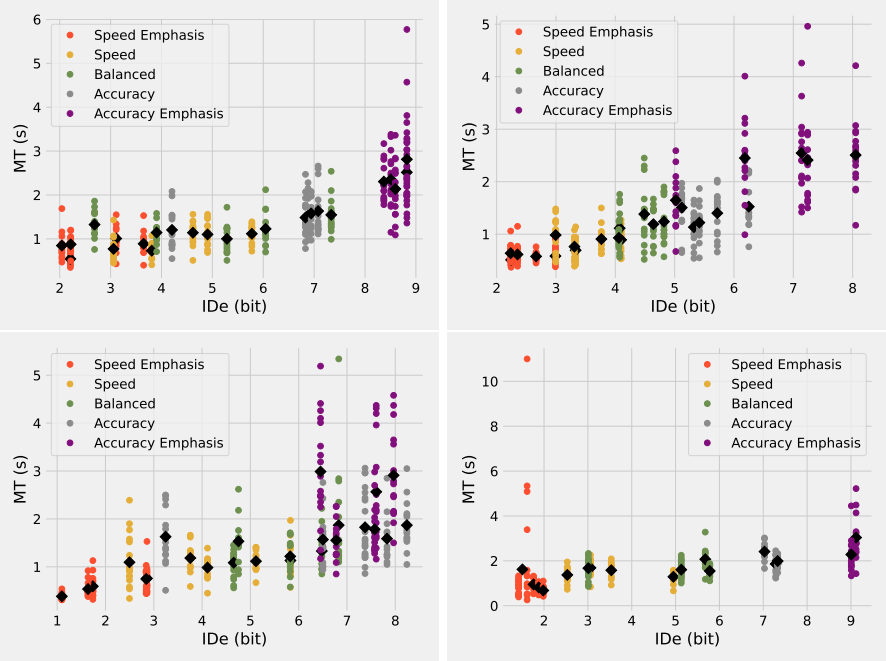

Figure 12: ¡caption¿