Chrononormativity Canadian 2020 Analysis

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Pearson Correlations

Ideology, chronotype, and chrononormativity don't correlate strongly with one another. Correlations, on average around -1 or 1. All p-values are significant except for chrononormativity and ideology. Significant p-values are not unexpected given the large n-sizes.

```
cor_frame1
```

```
##                   Ideology Chronotype Chrononormativity
## Ideology              1.00      -0.13              0.06
## Chronotype           -0.13       1.00             -0.11
## Chrononormativity     0.06      -0.11              1.00
##
## n
##                   Ideology Chronotype Chrononormativity
## Ideology               860        820               841
## Chronotype             820        950               926
## Chrononormativity      841        926               971
##
## P
##                   Ideology Chronotype Chrononormativity
## Ideology                   0.0002     0.0873
## Chronotype        0.0002              0.0005
## Chrononormativity 0.0873   0.0005
```

Bivariate Regression Models

There is not a significant p-value for the relationship between chrononormativity (IV) and ideology (DV). With controls included, chronotype, age, gender, and education are significant.

There is a significant p-value for the relationship between chrononormativity (IV) and chronotype (DV). With controls included, ideology, age, and chrononormativity are significant.

Model 1 is a bivariage regression with chrononormativity as the IV and ideology as the DV.
Model 7 is a bivariate regression with chrononormativity as the IV and chronotype as the DV.

The other models include all of the other controls: age, income, gender, and party. Model 6 also has chronotype as a control, and model 12 has ideology as a control.

Variable Key
sum_normativity is chrononormativity
chronotype_delay is chronotype
cps21_lr_scale_bef_1 is ideology

```
summary(m1)
```

```
##
## Call:
## lm(formula = cps21_lr_scale_bef_1 ~ sum_normativity, data = canada)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -5.2274 -1.9850 -0.0197  1.7726  5.0150
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)      4.98502    0.10924  45.633   <2e-16 ***
## sum_normativity  0.03463    0.02023   1.712   0.0873 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.329 on 839 degrees of freedom
##   (155 observations deleted due to missingness)
## Multiple R-squared:  0.00348,    Adjusted R-squared:  0.002292
## F-statistic:  2.93 on 1 and 839 DF,  p-value: 0.08732
```

```
summary(m6)
```

```
##
## Call:
## lm(formula = cps21_lr_scale_bef_1 ~ sum_normativity + chronotype_delay +
##     cps21_age + cps21_genderid + cps21_education + cps21_fed_id,
##     data = canada)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -5.6168 -1.6893 -0.0566  1.5454  6.4153
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)       6.795897   0.649684  10.460  < 2e-16 ***
## sum_normativity   0.023027   0.020582   1.119  0.26358
## chronotype_delay -0.171284   0.059220  -2.892  0.00393 **
## cps21_age         0.010787   0.004967   2.172  0.03016 *
## cps21_genderid   -0.388966   0.163248  -2.383  0.01742 *
## cps21_education  -0.134812   0.045400  -2.969  0.00307 **
## cps21_fed_id     -0.033722   0.038216  -0.882  0.37782
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.275 on 795 degrees of freedom
##   (194 observations deleted due to missingness)
## Multiple R-squared:  0.04945,    Adjusted R-squared:  0.04227
## F-statistic: 6.892 on 6 and 795 DF,  p-value: 3.775e-07
```

```
summary(m7)
```

```
##
## Call:
```

```
## lm(formula = chronotype_delay ~ sum_normativity, data = canada)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.4779 -0.9403 -0.2263  0.6899  7.3586
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)      3.55806    0.06238  57.037  < 2e-16 ***
## sum_normativity -0.04007    0.01151  -3.481 0.000524 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.401 on 924 degrees of freedom
##   (70 observations deleted due to missingness)
## Multiple R-squared:  0.01294,    Adjusted R-squared:  0.01187
## F-statistic: 12.11 on 1 and 924 DF,  p-value: 0.0005238
```

```
summary(m12)
```

```
##
## Call:
## lm(formula = chronotype_delay ~ sum_normativity + cps21_lr_scale_bef_1 +
##     cps21_age + cps21_genderid + cps21_education + cps21_fed_id,
##     data = canada)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.4055 -0.9235 -0.1427  0.6922  6.6930
##
## Coefficients:
##                         Estimate Std. Error t value Pr(>|t|)
## (Intercept)           4.8332786  0.3755659  12.869  < 2e-16 ***
## sum_normativity      -0.0289887  0.0122288  -2.371  0.01800 *
## cps21_lr_scale_bef_1 -0.0607947  0.0210193  -2.892  0.00393 **
## cps21_age            -0.0163315  0.0029107  -5.611 2.78e-08 ***
## cps21_genderid        0.0818580  0.0975607   0.839  0.40170
## cps21_education      -0.0388751  0.0271624  -1.431  0.15276
## cps21_fed_id          0.0007989  0.0227786   0.035  0.97203
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.355 on 795 degrees of freedom
##   (194 observations deleted due to missingness)
## Multiple R-squared:  0.06877,    Adjusted R-squared:  0.06174
## F-statistic: 9.784 on 6 and 795 DF,  p-value: 2.024e-10
```

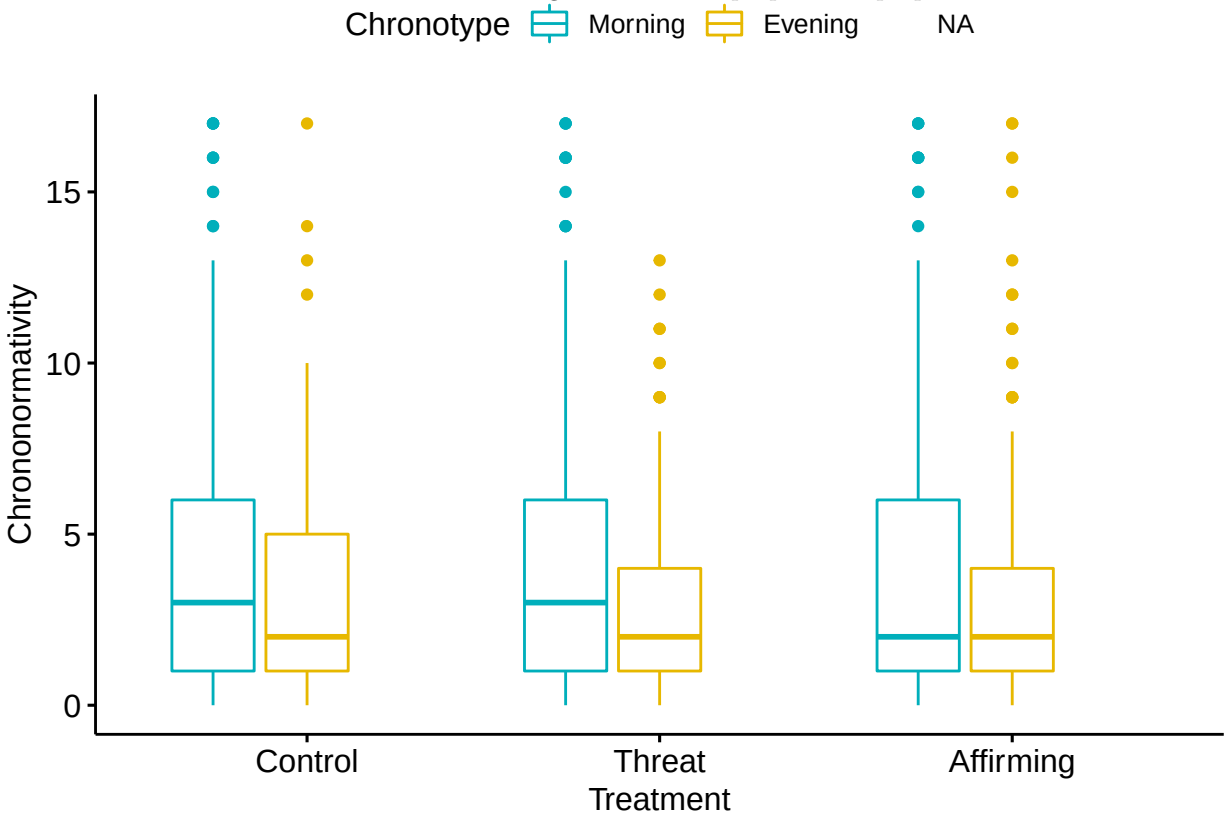
Difference in Means

Chronotype has a significant p-value in the analysis. Interestingly, it appears as though morning types were more likely to relax in the system affirming condition.

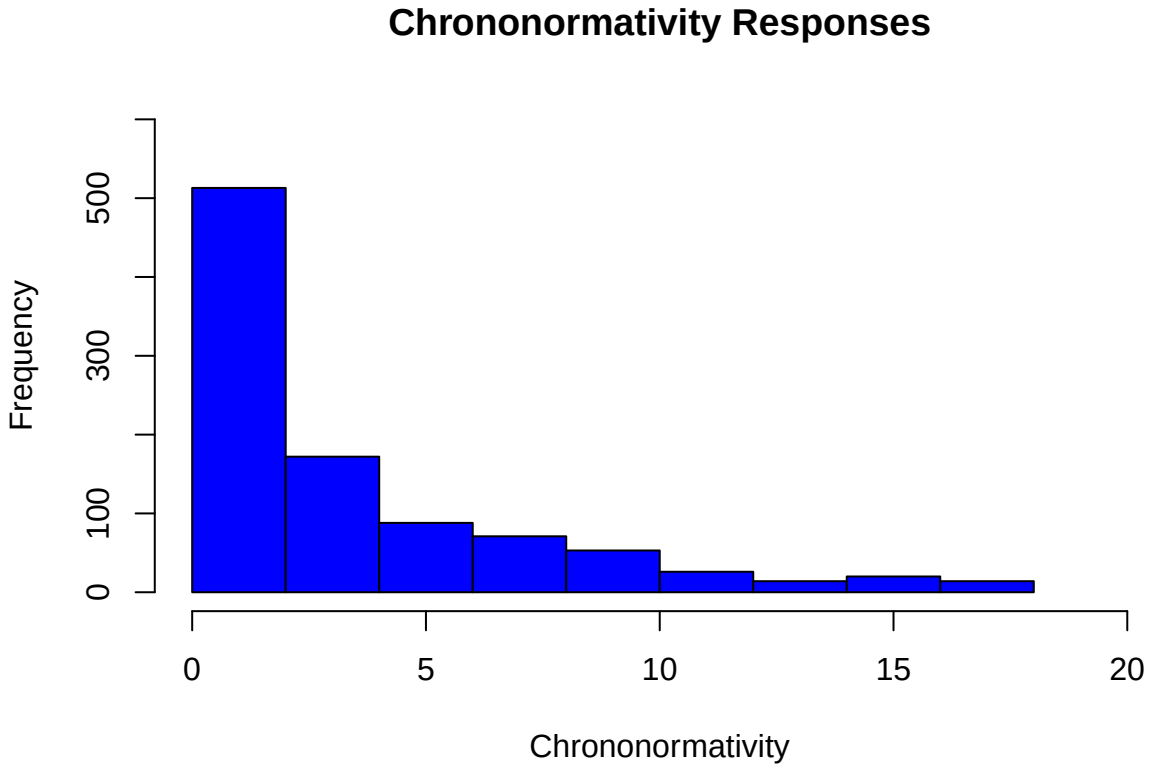
```
## `summarise()` has grouped output by 'Treatment'. You can override using the `.groups` argument.
```

```
## # A tibble: 9 x 5
## # Groups:   Treatment [3]
##   Treatment Chronotype count  mean    sd
##   <fct>     <fct>      <int> <dbl> <dbl>
## 1 Control   Morning      183  4.09  4.40
## 2 Control   Evening      120  2.96  3.28
## 3 Control   <NA>          14  4.38  4.46
## 4 Threat    Morning      194  4.20  4.23
## 5 Threat    Evening      116  2.79  3.04
## 6 Threat    <NA>          16  3.38  4.33
## 7 Affirming Morning      195  4     4.33
## 8 Affirming Evening      142  3.19  3.74
## 9 Affirming <NA>          16  4.5   5.03
```

Higher levels on the y-axis for chrononormativity reflect thinking there is a proper or improper time for certain activities. Lower scores indicate thinking there is not a proper or improper time for certain activities.




```
##                       Df Sum Sq Mean Sq F value  Pr(>F)
## Treatment              2      0    0.10   0.007   0.993
## Chronotype             1    272  271.51  17.185 3.7e-05 ***
## Treatment:Chronotype   2     14    6.85   0.434   0.648
## Residuals            920  14536   15.80
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 70 observations deleted due to missingness
```




```
##                       Df Sum Sq Mean Sq F value  Pr(>F)
## Treatment              2      0    0.10   0.007   0.993
## Chronotype             1    272  271.51  17.185 3.7e-05 ***
## Treatment:Chronotype   2     14    6.85   0.434   0.648
## Residuals            920  14536   15.80
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 70 observations deleted due to missingness
```

```
## Anova Table (Type III tests)
##
## Response: Chrononormativity
##                       Sum Sq  Df  F value  Pr(>F)
## (Intercept)           2945.5   1 186.4253 < 2e-16 ***
## Treatment                3.9   2   0.1231 0.88416
## Chronotype              90.7   1   5.7422 0.01676 *
## Treatment:Chronotype    13.7   2   0.4337 0.64823
## Residuals            14535.7 920
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

IRT

All items except number 16 discriminate with values over 1.

All of the items also fit the model.

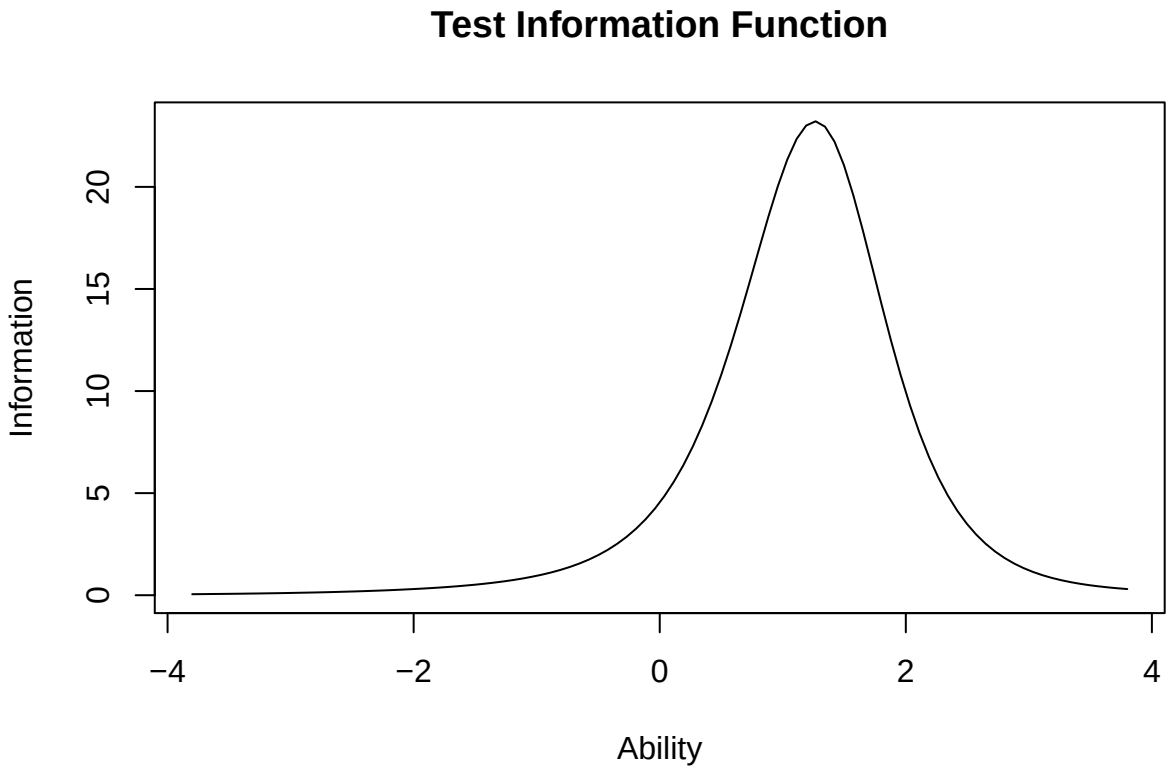
The last three items are capturing the most variation in terms of people. That is, more extreme ends of the curve/middle of the curve are captured.

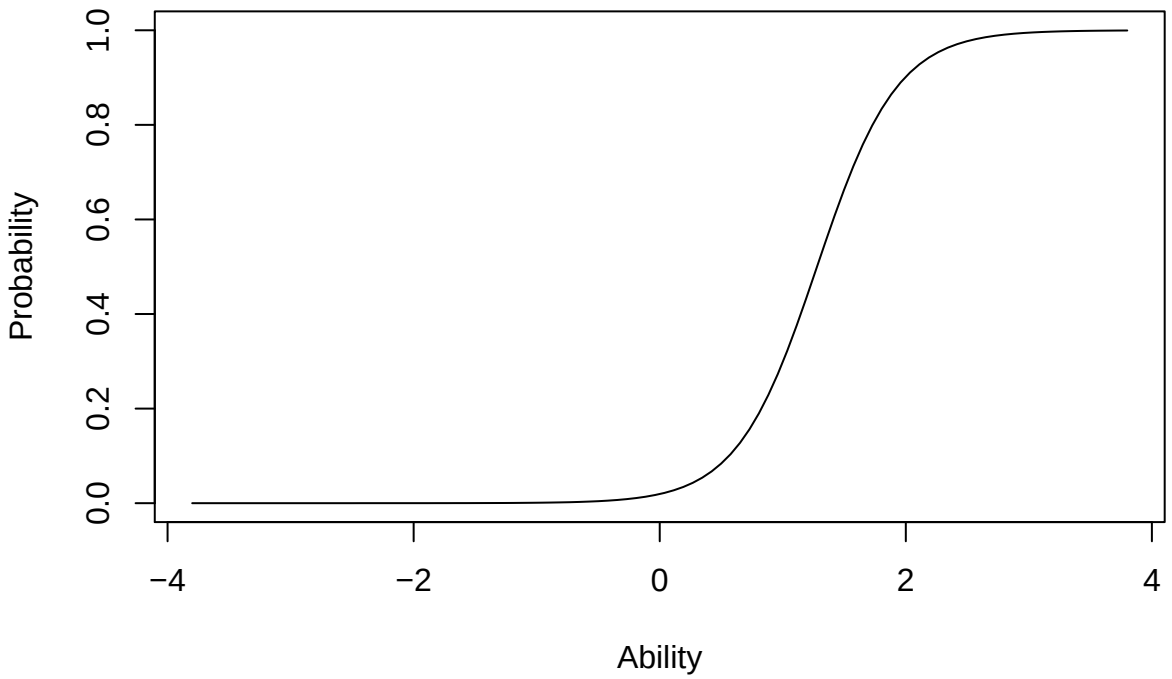
Test Information Curve is capturing roughly 1 standard deviation above the norm on all items. (The Item Characteristic Curves are included for all items. The first graph represents item 1, the second graph represents item 2, etc.)

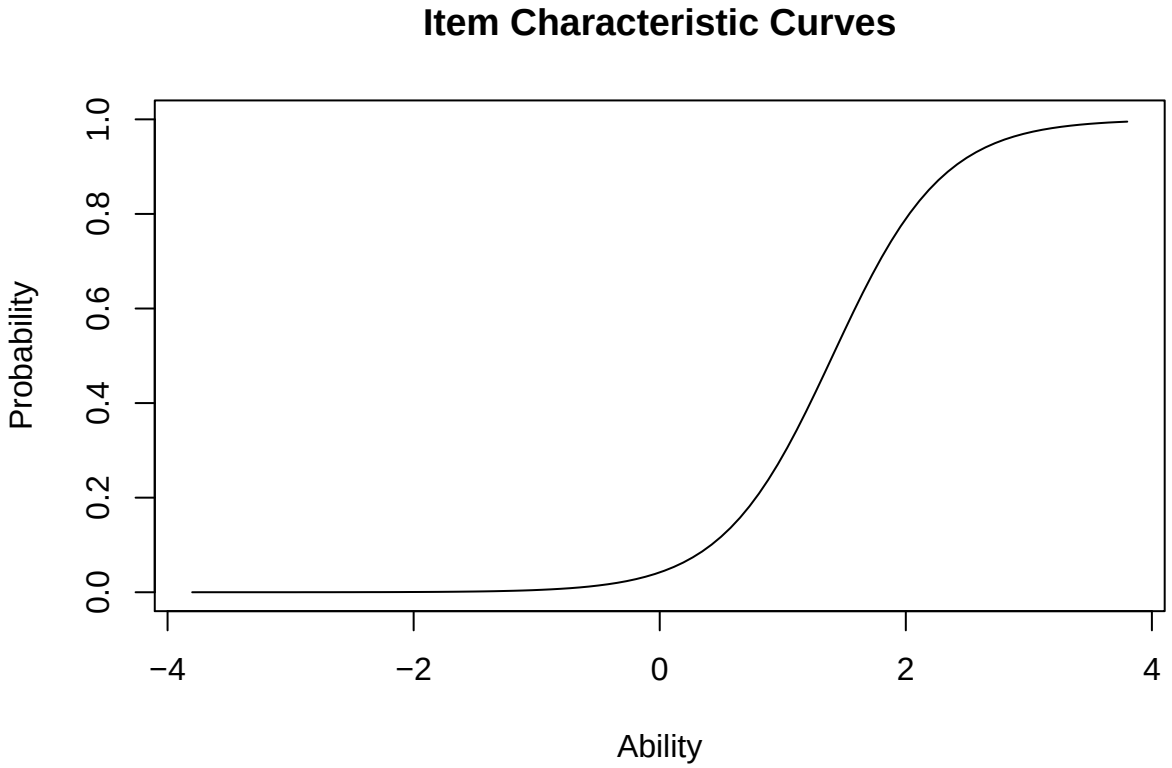
```
##                       Dffclt    Dscrmn
## cps21_Alex_Q4_1   1.2782583 3.0719380
## cps21_Alex_Q4_2   1.4053432 2.2258395
## cps21_Alex_Q4_3   1.2958771 2.6417167
## cps21_Alex_Q4_4   1.3649277 3.1206535
## cps21_Alex_Q4_5   1.2385309 2.4341664
## cps21_Alex_Q4_6   1.1232307 3.0844010
## cps21_Alex_Q4_7   1.0786163 2.7536188
## cps21_Alex_Q4_8   1.3899724 3.6204069
## cps21_Alex_Q4_9   1.3029439 2.7128249
## cps21_Alex_Q4_10  1.0461013 1.9071532
## cps21_Alex_Q4_11  0.8866643 1.8848789
## cps21_Alex_Q4_12  0.9044177 1.8435792
## cps21_Alex_Q4_13  1.0055864 2.2234262
## cps21_Alex_Q4_14  1.4152676 1.9507371
## cps21_Alex_Q4_15 -0.5625429 1.0067145
## cps21_Alex_Q4_16  2.2818218 0.7393729
## cps21_Alex_Q4_17  0.5000379 1.2862930
```

```
##
## Item-Fit Statistics and P-values
##
## Call:
## ltm(formula = chrononormativity ~ z1, IRT.param = T)
##
## Alternative: Items do not fit the model
## Ability Categories: 10
##
##                       X^2 Pr(>X^2)
## cps21_Alex_Q4_1  10.1973   0.2515
## cps21_Alex_Q4_2   5.8832   0.6603
## cps21_Alex_Q4_3   2.1304   0.9768
## cps21_Alex_Q4_4   6.3934   0.6033
## cps21_Alex_Q4_5   1.0840   0.9977
## cps21_Alex_Q4_6   6.2896   0.6148
## cps21_Alex_Q4_7   3.9383   0.8626
## cps21_Alex_Q4_8   5.2953   0.7256
## cps21_Alex_Q4_9   8.7376   0.3649
## cps21_Alex_Q4_10  7.4160   0.4925
## cps21_Alex_Q4_11  3.6370   0.8883
## cps21_Alex_Q4_12  5.6110   0.6907
## cps21_Alex_Q4_13 11.5260   0.1736
## cps21_Alex_Q4_14  6.3770   0.6051
## cps21_Alex_Q4_15  8.6850   0.3696
```

```
## cps21_Alex_Q4_16 11.6806    0.166
## cps21_Alex_Q4_17 10.3879   0.2388
```






Item Characteristic Curves
Probability
0.0
0.2
0.4
0.6
0.8
1.0
−4
−2
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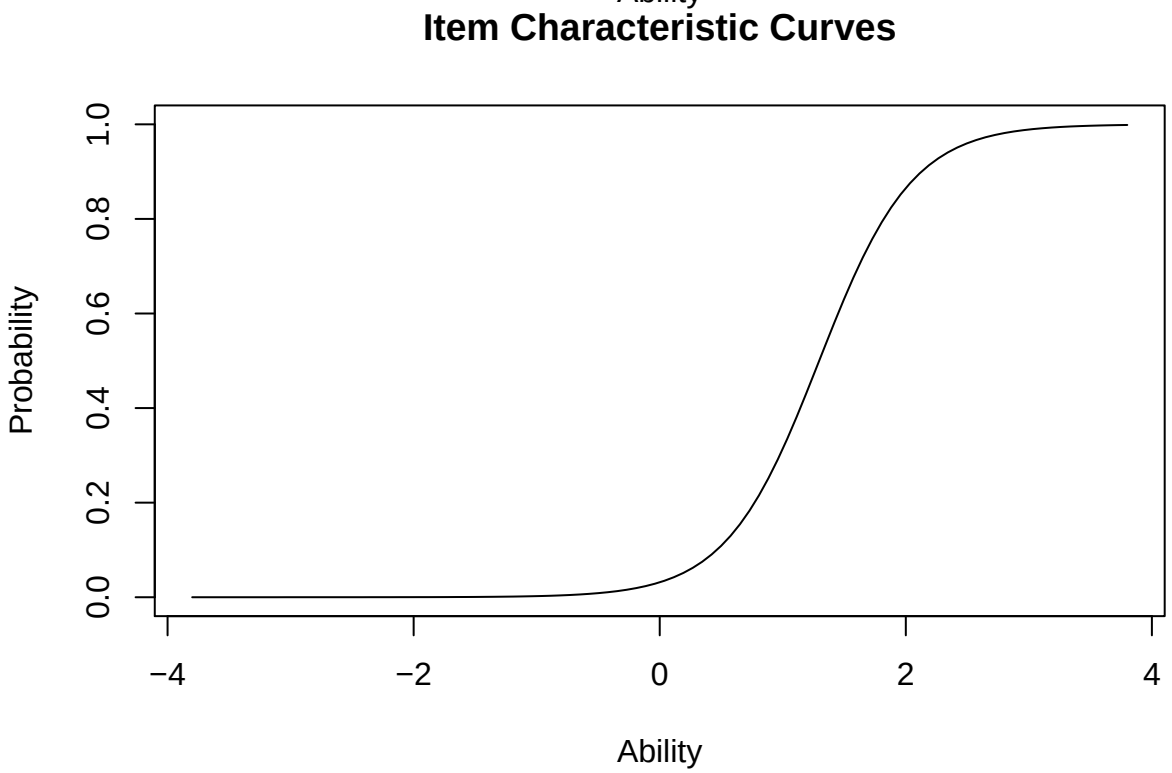
2
4
Ability


Item Characteristic Curves
Probability
0.0
0.2
0.4
0.6
0.8
1.0
−4
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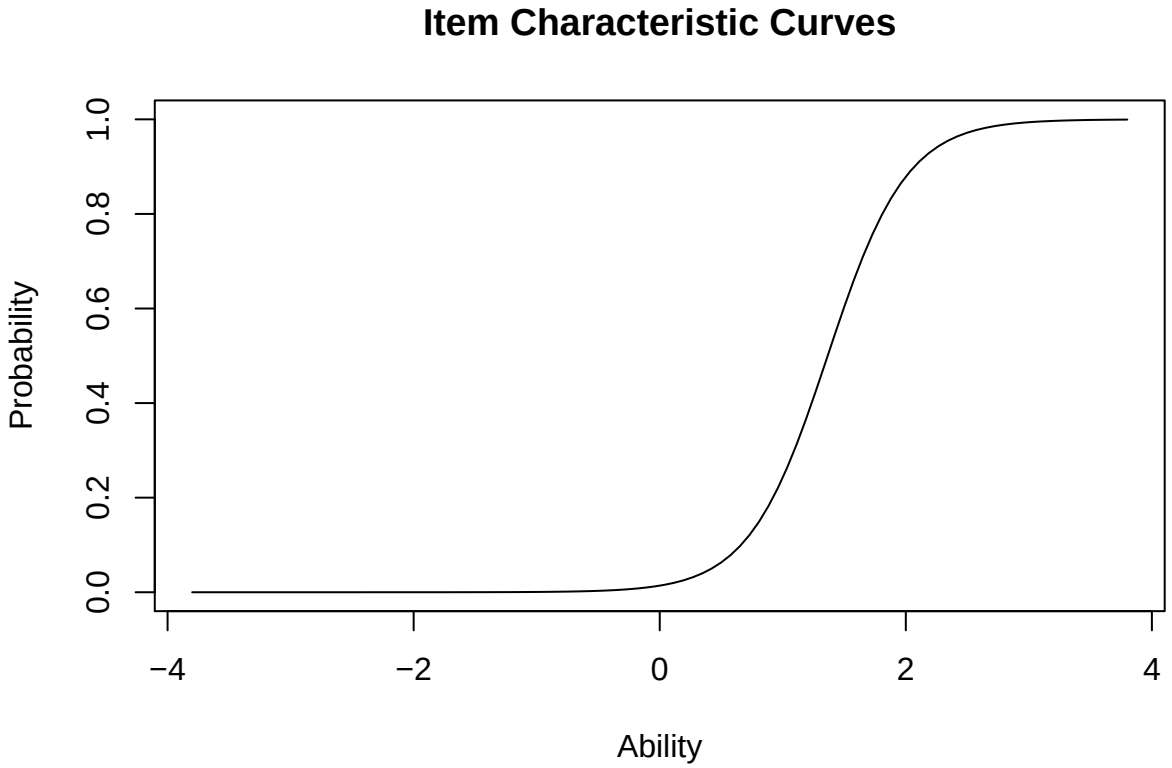
Ability


Item Characteristic Curves
Probability
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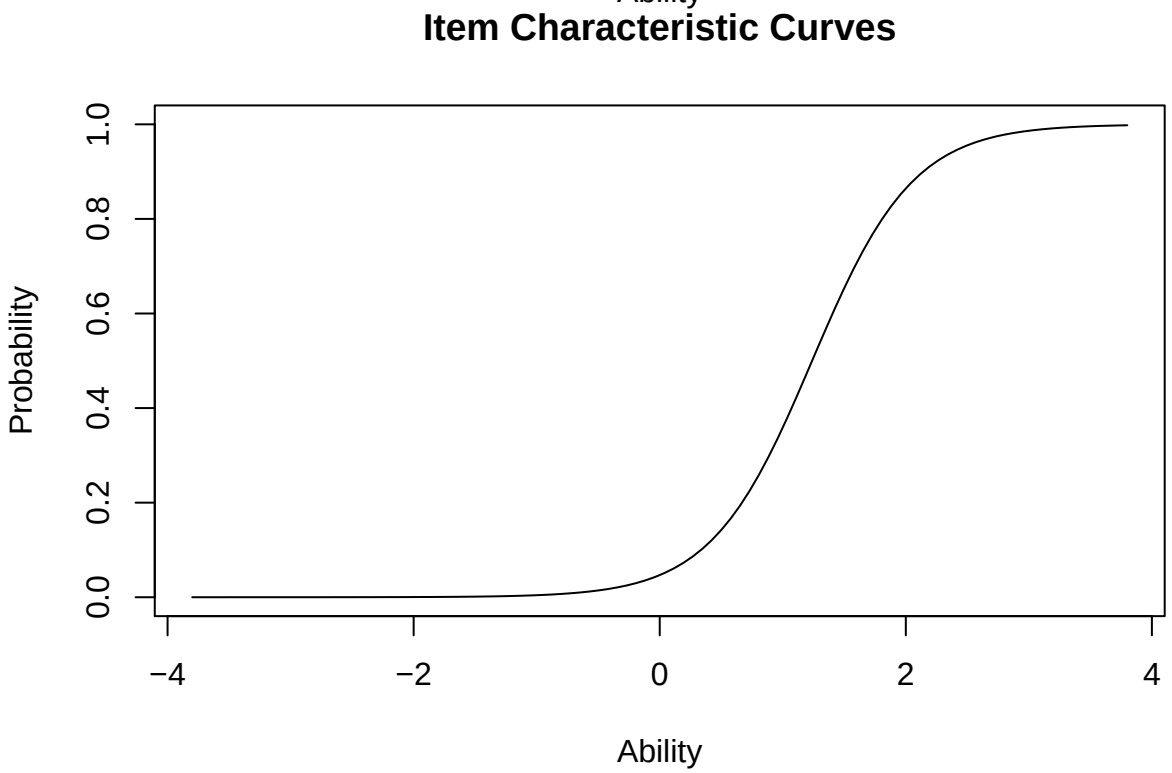
Ability


Item Characteristic Curves
Probability
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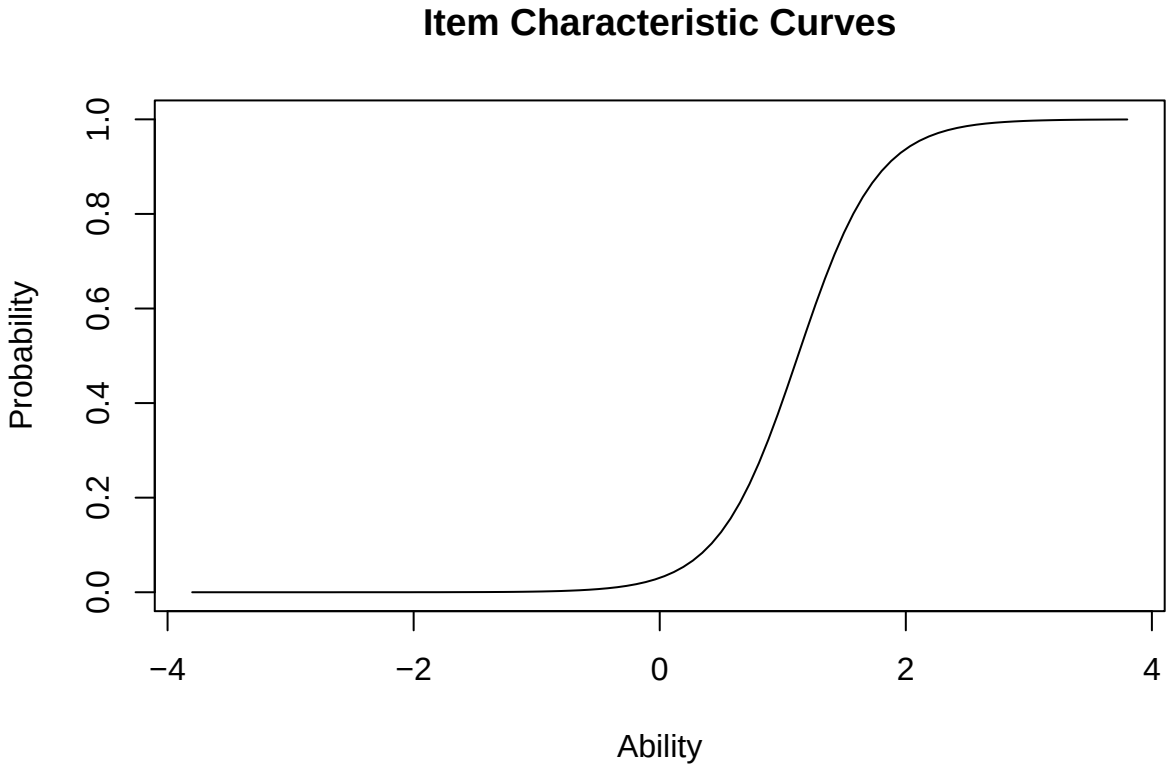
Ability


Item Characteristic Curves
Probability
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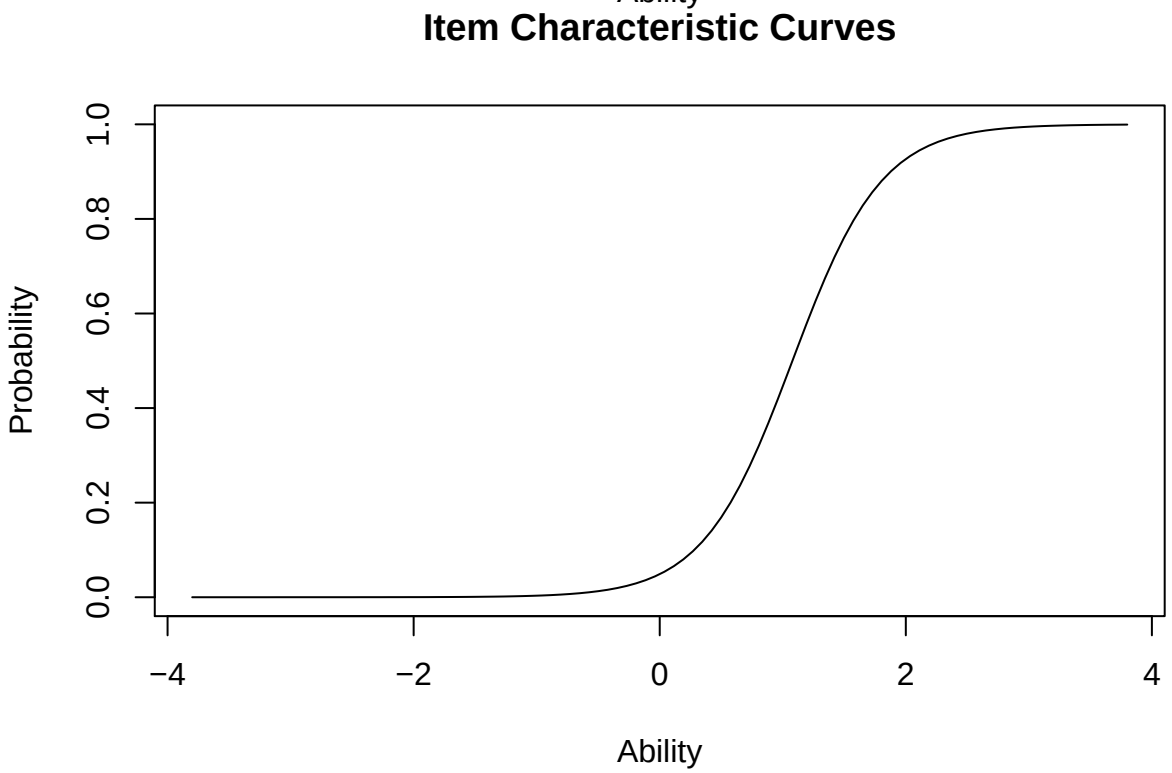
Ability


Item Characteristic Curves
Probability
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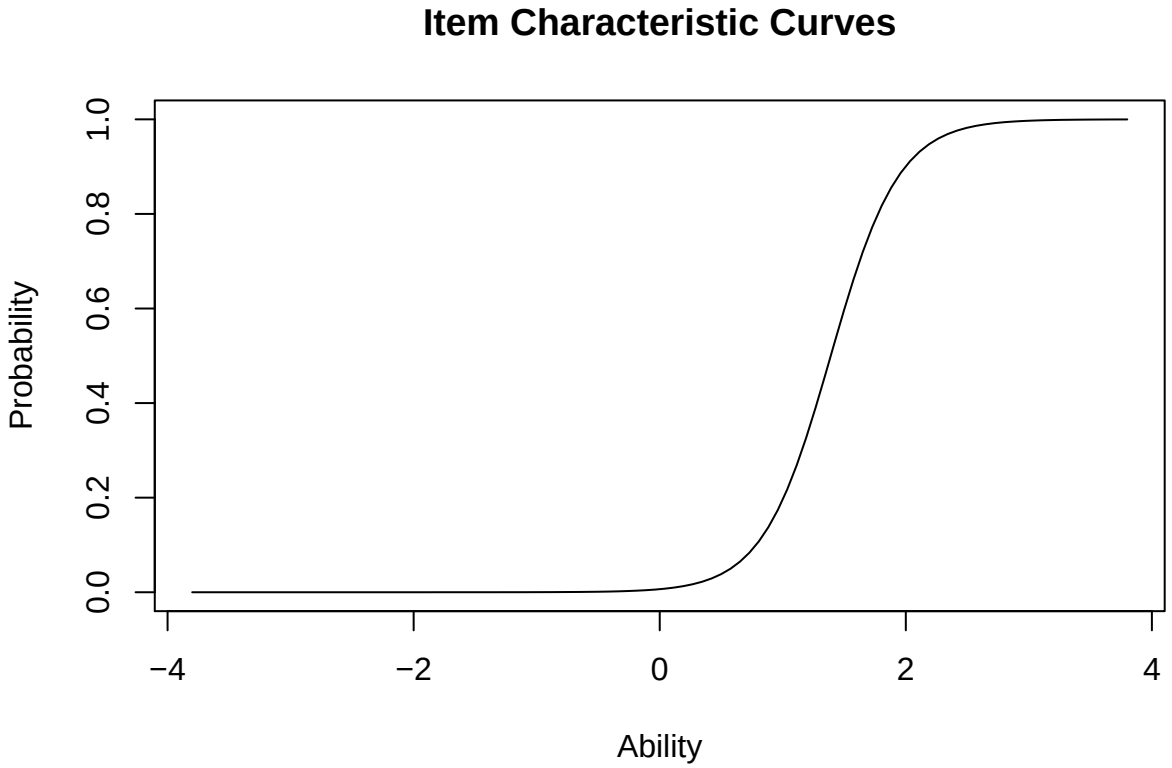
Ability


Item Characteristic Curves
Probability
0.0
0.2
0.4
0.6
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0
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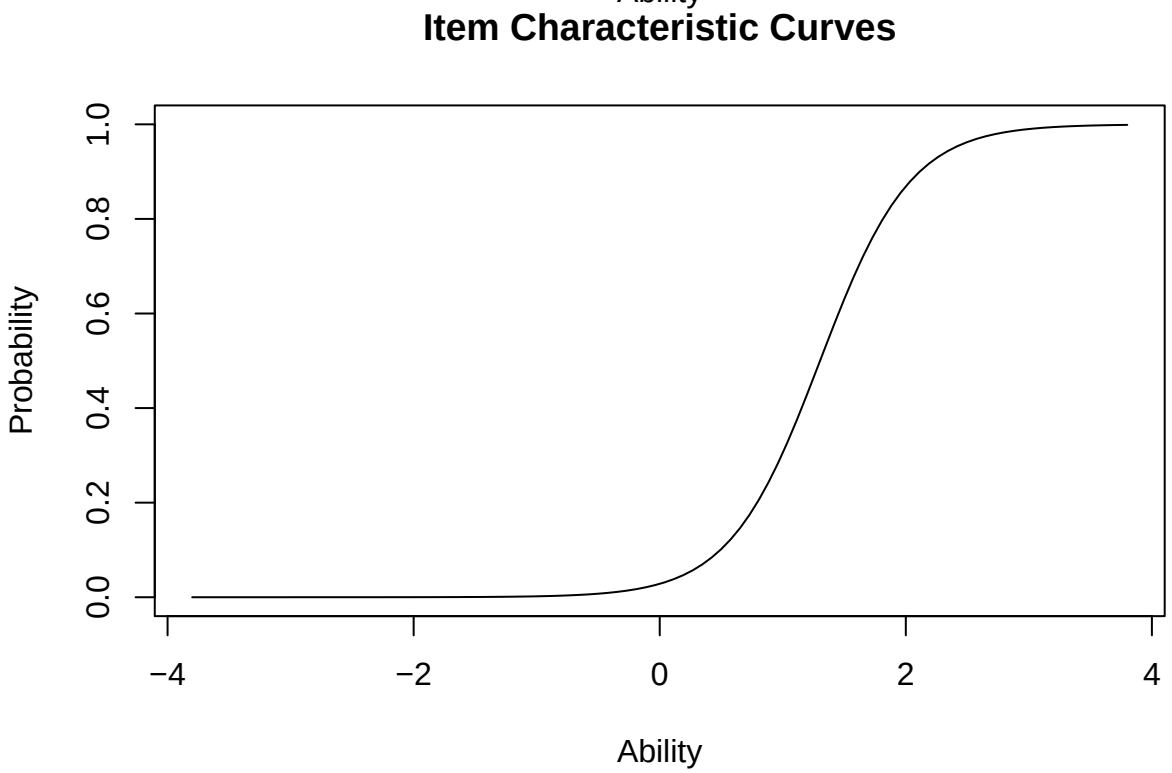
4
Ability


Item Characteristic Curves
Probability
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0.2
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0.6
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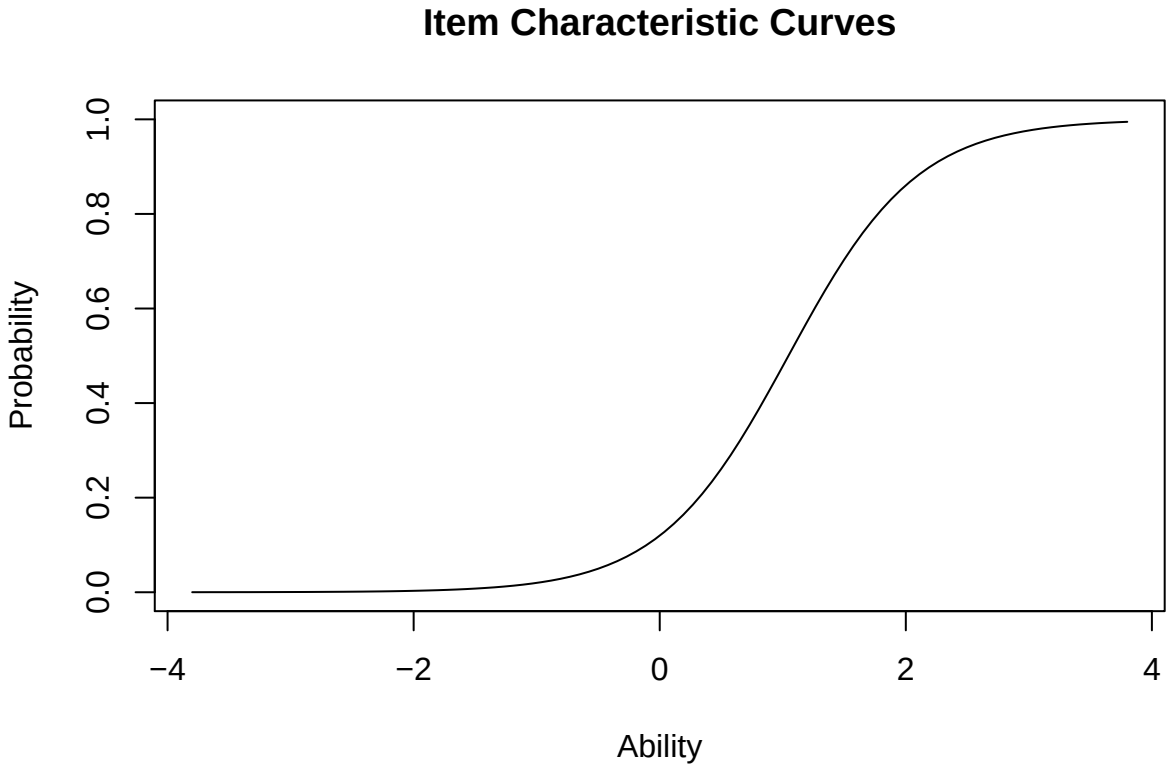
4
Ability


Item Characteristic Curves
Probability
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0.2
0.4
0.6
0.8
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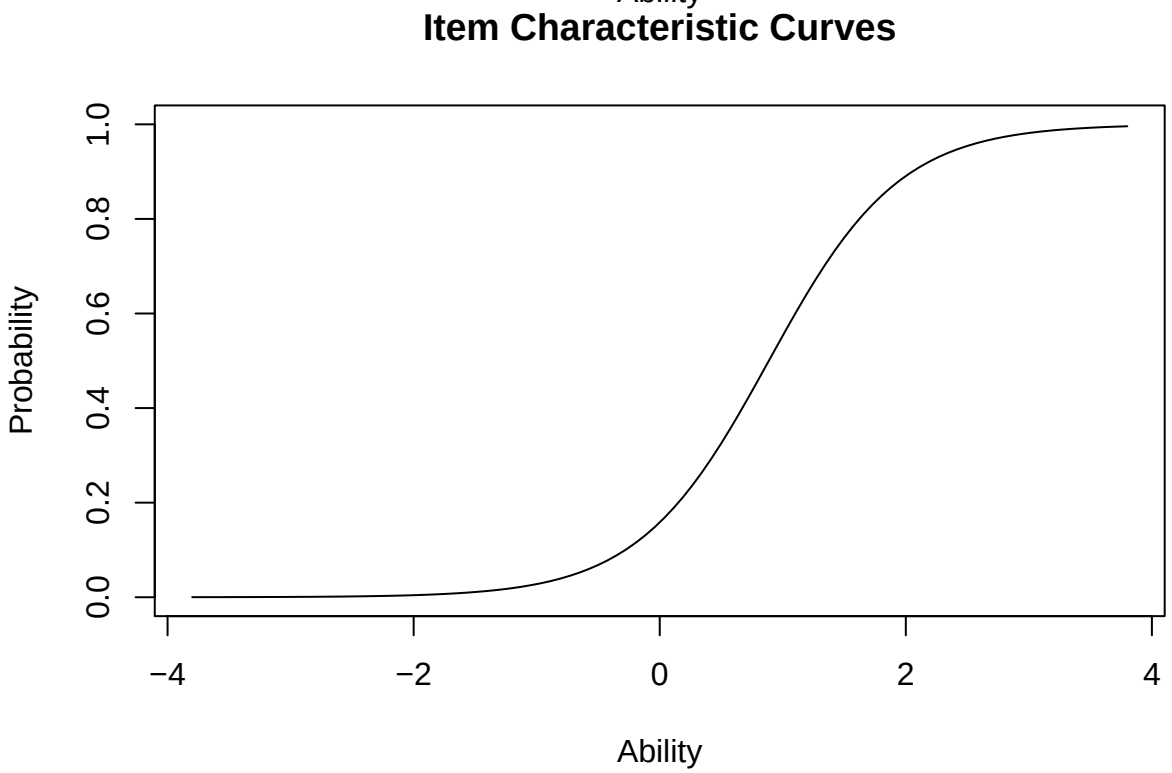
0
2
4
Ability


Item Characteristic Curves
Probability
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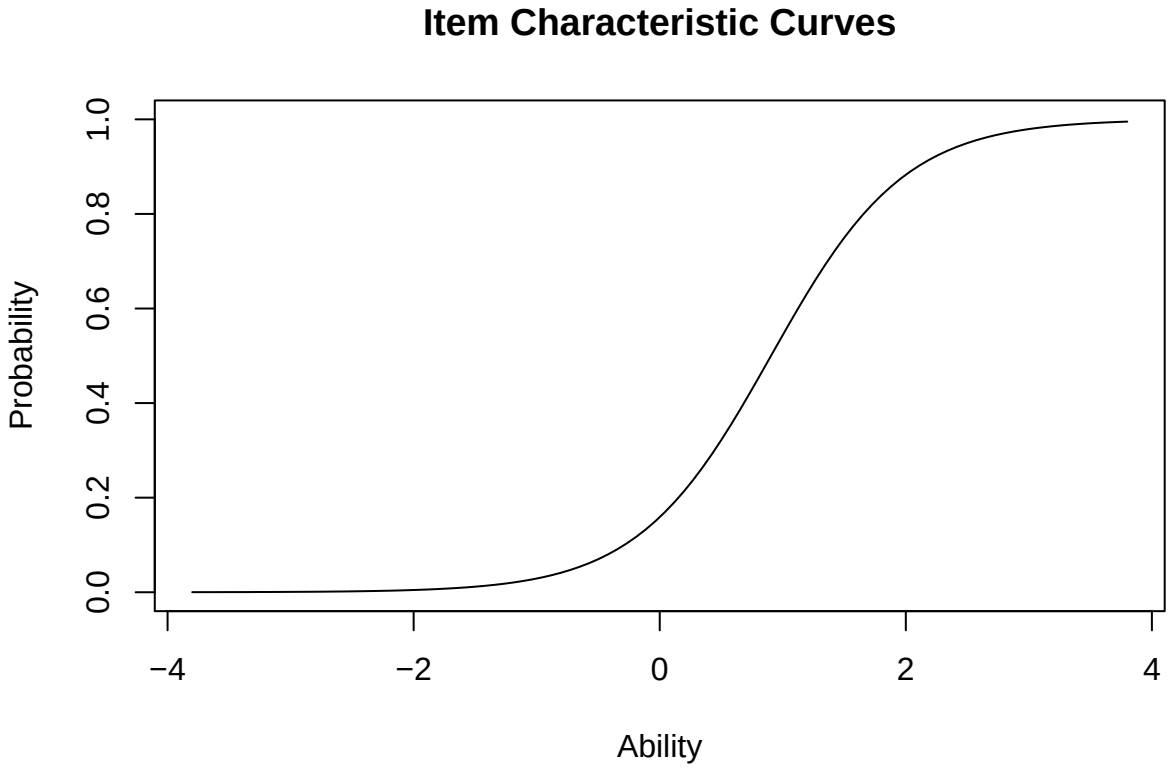
0.2
0.4
0.6
0.8
1.0
−4
−2
0
2
4
Ability


Item Characteristic Curves
Probability
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0.2
0.4
0.6
0.8
1.0
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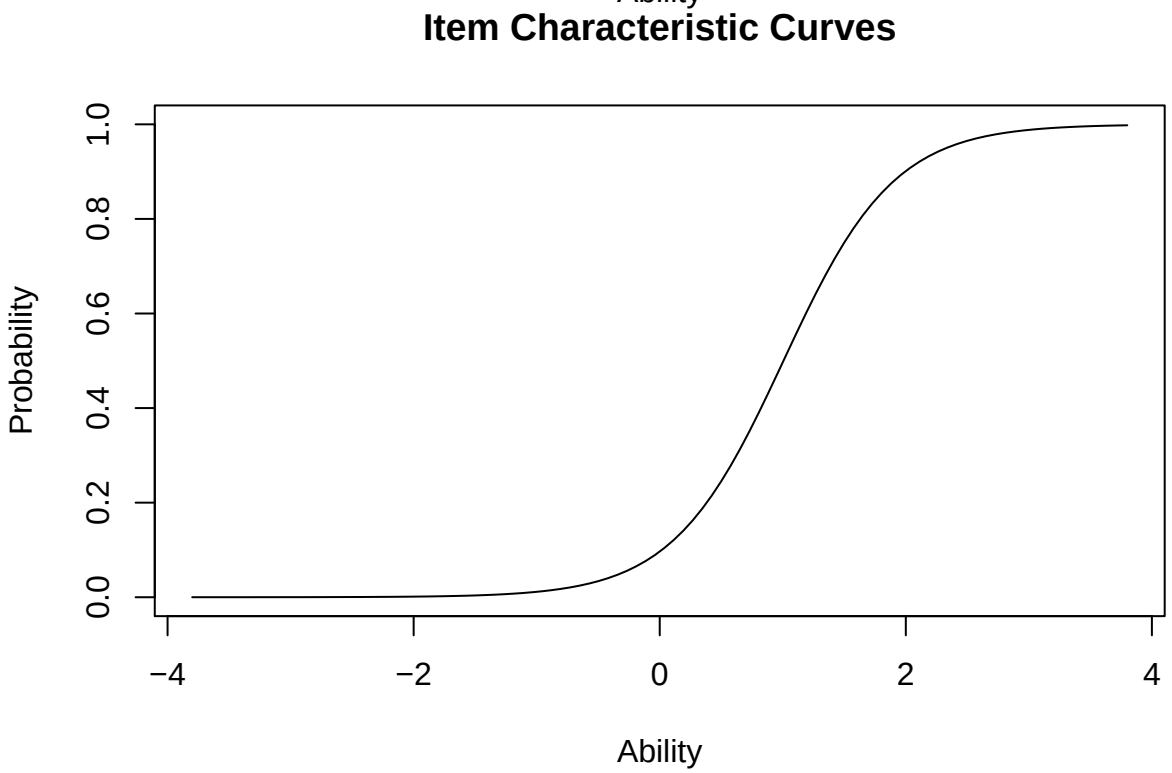
Ability


Item Characteristic Curves
Probability
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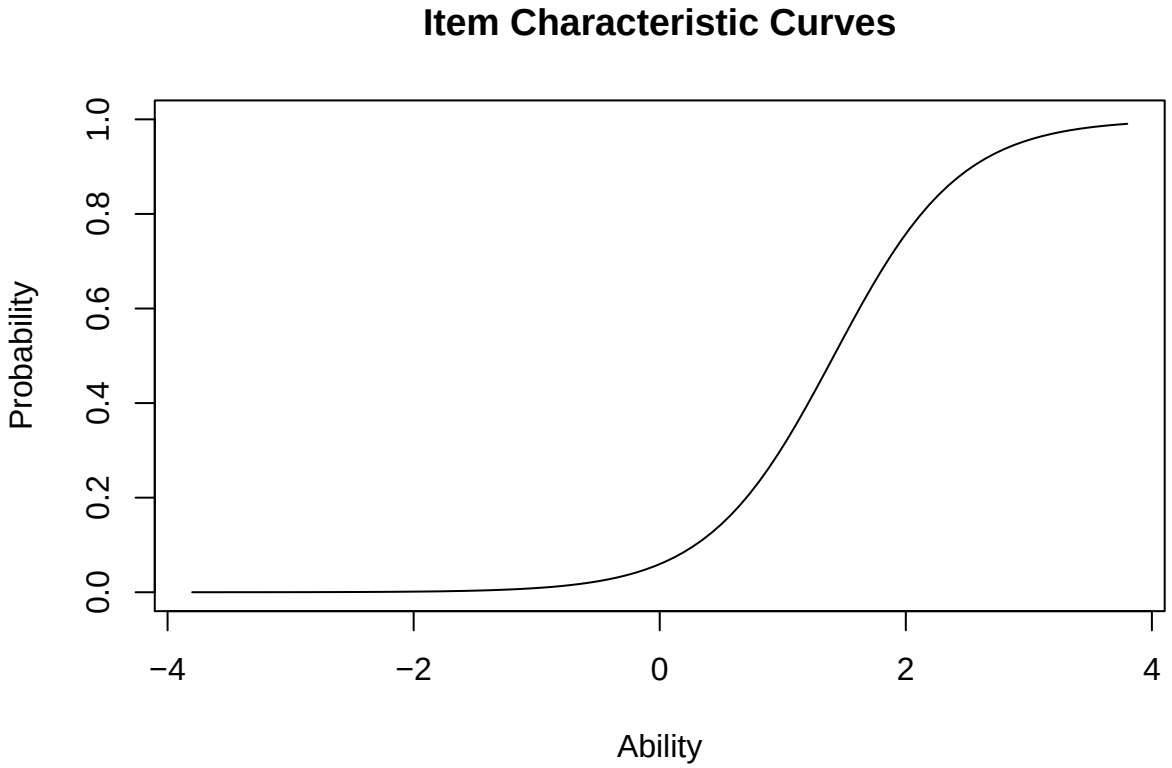
Ability


Item Characteristic Curves
Probability
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0.2
0.4
0.6
0.8
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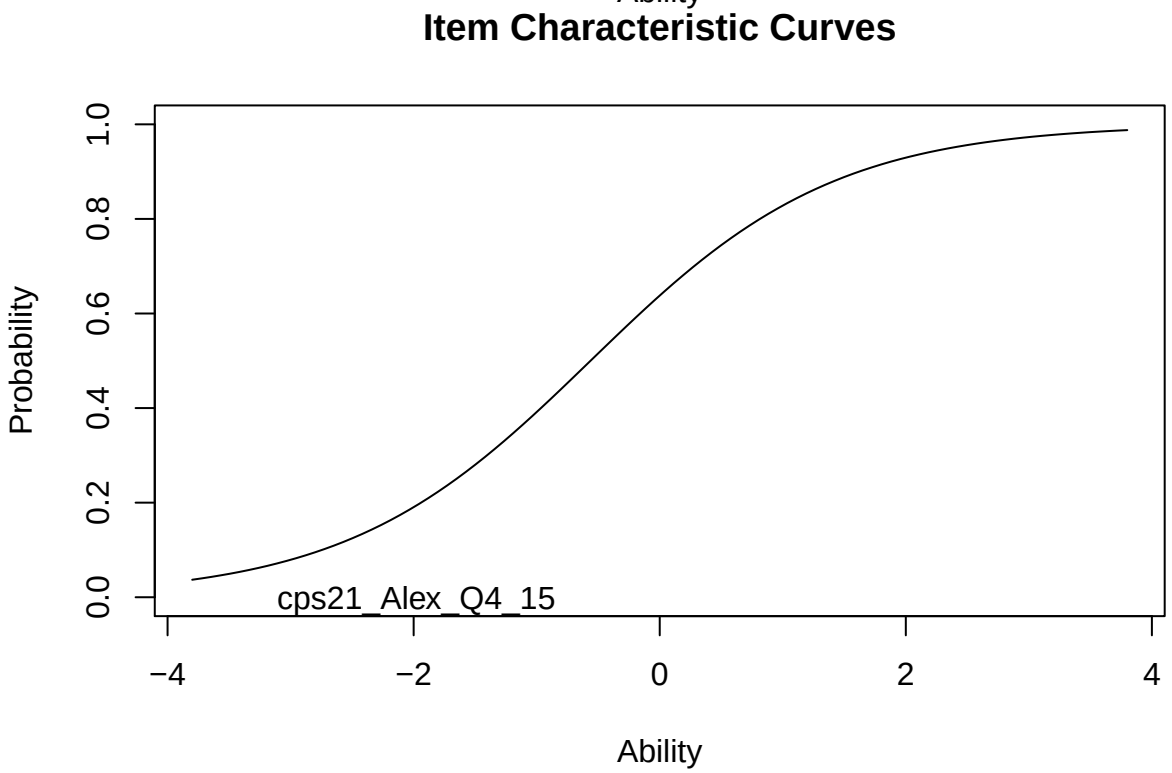
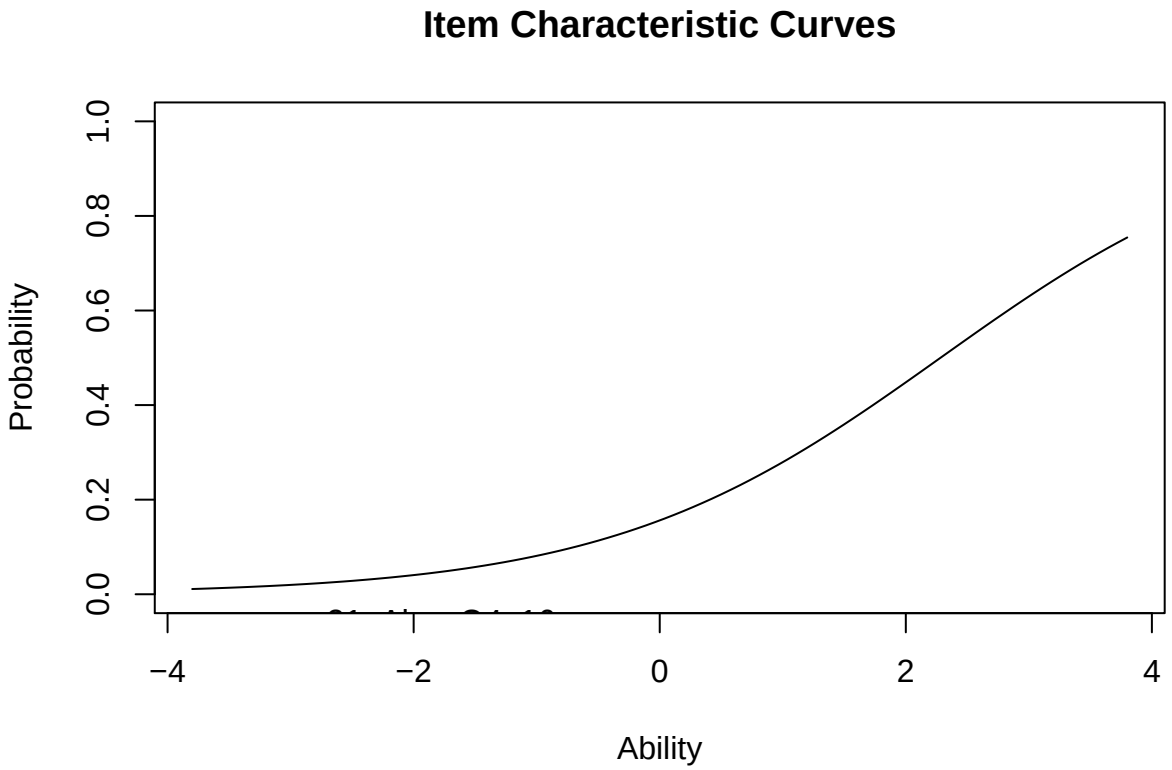
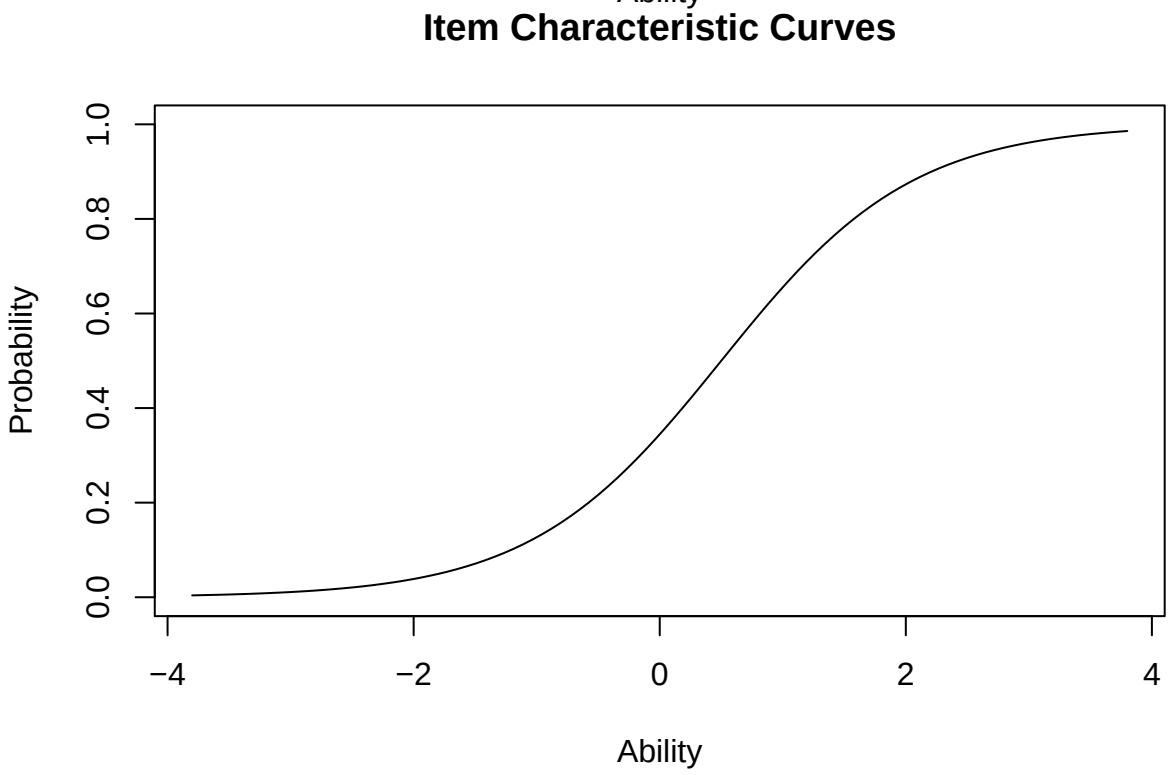
Ability


Item Characteristic Curves
Probability
0.0
0.2
0.4
0.6
0.8
1.0
cps21_Alex_Q4_15
−4
−2
0
2
4
Ability


Item Characteristic Curves
Probability
0.0
0.2
0.4
0.6
0.8
1.0
−4
−2
0
2
4
Ability


Item Characteristic Curves
Probability
0.0
0.2
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0.8
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0
2
4
Ability