

# Chrononormativity CCES 2020 Analysis

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## Pearson Correlations

Summary: The only relationships that don't have a significant relationship are Chrononormativity with Ideology, Chronotype, & Conventionalism. The strongest correlations are between System Justification & Ideology (0.54), Conventionalism & Ideology (0.52), and System Justification & Conventionalism (0.48).

```
##          Normativity System Ideology Type Conventionalism
## Normativity          1.00   0.08    0.03 -0.01           0.02
## System              0.08   1.00    0.54 -0.16           0.48
## Ideology            0.03   0.54    1.00 -0.14           0.52
## Type              -0.01  -0.16   -0.14  1.00          -0.14
## Conventionalism     0.02   0.48    0.52 -0.14           1.00
##
## n
##          Normativity System Ideology Type Conventionalism
## Normativity          929   807    864  860           913
## System              807   859    806  799           842
## Ideology            864   806    928  858           910
## Type              860   799    858  924           908
## Conventionalism     913   842    910  908           981
##
## P
##          Normativity System Ideology Type Conventionalism
## Normativity          0.0223 0.4224 0.7748 0.5450
## System              0.0223      0.0000 0.0000 0.0000
## Ideology            0.4224      0.0000 0.0000 0.0000
## Type              0.7748      0.0000 0.0000 0.0000
## Conventionalism     0.5450      0.0000 0.0000 0.0000
##
##          Normativity System Ideology Type Conventionalism
## Normativity          1.00   0.08    0.02 -0.01           0.01
## System              0.08   1.00    0.54 -0.16           0.48
## Ideology            0.02   0.54    1.00 -0.14           0.52
## Type              -0.01  -0.16   -0.14  1.00          -0.14
## Conventionalism     0.01   0.48    0.52 -0.14           1.00
##
## n
##          Normativity System Ideology Type Conventionalism
## Normativity          938   816    873  869           922
## System              816   859    806  799           842
## Ideology            873   806    928  858           910
## Type              869   799    858  924           908
## Conventionalism     922   842    910  908           981
```

```

##
## P
##
## Normativity System Ideology Type Conventionalism
## Normativity      0.0248 0.4608 0.8419 0.7523
## System           0.0248      0.0000 0.0000 0.0000
## Ideology          0.4608      0.0000      0.0000 0.0000
## Type              0.8419      0.0000 0.0000      0.0000
## Conventionalism 0.7523      0.0000 0.0000 0.0000

```

# Bivivariate Regression Tables

System Justification relationship with Chrononormativity is significant.

Table 1: Major Variables Conventionalism

	<i>Dependent variable:</i>			
	Conventionalism			
	(1)	(2)	(3)	(4)
Normativity	0.021 (0.035)	0.008 (0.032)	0.004 (0.034)	0.013 (0.036)
Ideology		1.181*** (0.067)	0.827*** (0.081)	0.862*** (0.084)
System			0.194*** (0.023)	0.178*** (0.024)
Type				−0.153* (0.083)
Constant	19.466*** (0.164)	14.877*** (0.302)	11.955*** (0.461)	12.693*** (0.607)
Observations	913	849	743	694
R <sup>2</sup>	0.0004	0.269	0.343	0.347
Adjusted R <sup>2</sup>	−0.001	0.267	0.341	0.343
Residual Std. Error	4.235 (df = 911)	3.701 (df = 846)	3.529 (df = 739)	3.528 (df = 689)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table 2: Controls Conventionalism

	<i>Dependent variable:</i>	
	Conventionalism	
	(1)	(2)
Normativity	0.021 (0.035)	0.078** (0.033)
age		0.076*** (0.007)
race		0.291*** (0.105)
income		0.005 (0.005)
gender		0.449* (0.259)
education		−0.023 (0.089)
party		0.735*** (0.060)
Constant	19.466*** (0.164)	11.736*** (0.774)
Observations	913	872
R <sup>2</sup>	0.0004	0.247
Adjusted R <sup>2</sup>	−0.001	0.241
Residual Std. Error	4.235 (df = 911)	3.748 (df = 864)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table 3: Major Variables Ideology

	<i>Dependent variable:</i>			
	Ideology			
	(1)	(2)	(3)	(4)
Normativity	0.013 (0.016)	−0.001 (0.015)	−0.003 (0.016)	−0.004 (0.015)
System		0.151*** (0.009)	0.151*** (0.009)	0.104*** (0.010)
Type			−0.040 (0.037)	−0.008 (0.035)
Conventionalism				0.152*** (0.015)
Constant	3.936*** (0.076)	0.556*** (0.208)	0.711*** (0.270)	−1.335*** (0.322)
Observations	864	757	705	694
R <sup>2</sup>	0.001	0.287	0.298	0.390
Adjusted R <sup>2</sup>	−0.0004	0.285	0.295	0.387
Residual Std. Error	1.900 (df = 862)	1.615 (df = 754)	1.591 (df = 701)	1.483 (df = 689)

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Table 4: Controls Ideology

	<i>Dependent variable:</i>	
	Ideology	
	(1)	(2)
Normativity	0.013 (0.016)	0.009 (0.012)
age		0.016*** (0.003)
race		0.118*** (0.037)
income		0.003* (0.002)
gender		0.025 (0.091)
education		−0.069** (0.031)
party		0.606*** (0.021)
Constant	3.936*** (0.076)	0.889*** (0.273)
Observations	864	842
R <sup>2</sup>	0.001	0.535
Adjusted R <sup>2</sup>	−0.0004	0.531
Residual Std. Error	1.900 (df = 862)	1.300 (df = 834)

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Table 5: Major Variables System Justification

	<i>Dependent variable:</i>			
	System			
	(1)	(2)	(3)	(4)
Normativity	0.141** (0.062)	0.099* (0.054)	0.105** (0.053)	0.114** (0.056)
Ideology		1.893*** (0.109)	1.348*** (0.123)	1.389*** (0.129)
Conventionalism			0.463*** (0.054)	0.421*** (0.056)
Type				-0.332*** (0.127)
Constant	22.540*** (0.271)	15.110*** (0.495)	8.192*** (0.936)	10.031*** (1.130)
Observations	807	757	743	694
R <sup>2</sup>	0.006	0.290	0.358	0.364
Adjusted R <sup>2</sup>	0.005	0.288	0.355	0.361
Residual Std. Error	6.678 (df = 805)	5.717 (df = 754)	5.448 (df = 739)	5.420 (df = 689)

Note:

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Table 6: Controls System Justification

	<i>Dependent variable:</i>	
	System	
	(1)	(2)
Normativity	0.141** (0.062)	0.151*** (0.055)
age		0.085*** (0.012)
race		0.203 (0.170)
income		-0.003 (0.007)
gender		-0.993** (0.416)
education		-0.197 (0.142)
party		1.506*** (0.096)
Constant	22.540*** (0.271)	14.496*** (1.300)
Observations	807	781
R <sup>2</sup>	0.006	0.303
Adjusted R <sup>2</sup>	0.005	0.297
Residual Std. Error	6.678 (df = 805)	5.672 (df = 773)

Note:

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Table 7: Major Variables Chronotype

	<i>Dependent variable:</i>			
	Type			
	(1)	(2)	(3)	(4)
Normativity	−0.004 (0.015)	0.002 (0.015)	0.004 (0.015)	0.005 (0.017)
Ideology		−0.119*** (0.031)	−0.060* (0.037)	−0.010 (0.042)
Conventionalism			−0.048*** (0.016)	−0.032* (0.017)
System				−0.030*** (0.011)
Constant	3.670*** (0.067)	4.126*** (0.140)	4.844*** (0.274)	4.936*** (0.302)
Observations	860	801	789	694
R <sup>2</sup>	0.0001	0.018	0.029	0.035
Adjusted R <sup>2</sup>	−0.001	0.016	0.026	0.029
Residual Std. Error	1.675 (df = 858)	1.652 (df = 798)	1.648 (df = 785)	1.618 (df = 689)

Note:

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Table 8: Controls Chronotype

	<i>Dependent variable:</i>	
	Type	
	(1)	(2)
Normativity	−0.004 (0.015)	−0.031** (0.015)
age		−0.023*** (0.003)
race		0.042 (0.048)
income		−0.003 (0.002)
gender		−0.121 (0.116)
education		−0.101** (0.040)
party		−0.057** (0.027)
Constant	3.670*** (0.067)	5.632*** (0.349)
Observations	860	824
R <sup>2</sup>	0.0001	0.077
Adjusted R <sup>2</sup>	−0.001	0.069
Residual Std. Error	1.675 (df = 858)	1.624 (df = 816)

Note:

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

## IRT Models

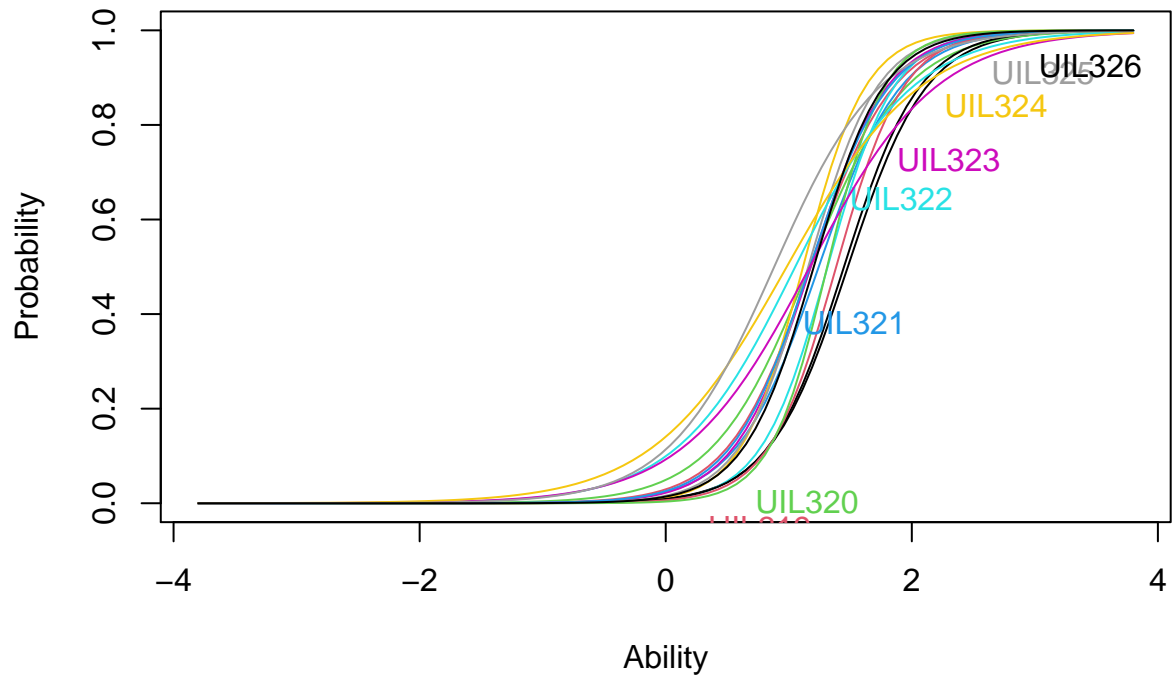
```
##           Dffc1t   Dscrmn
## UIL310  1.4801822  3.124124
## UIL311  1.1798857  2.967194
## UIL312  1.1668468  2.537627
## UIL313  1.2436085  2.996590
## UIL314  1.3154922  3.701549
## UIL315  1.1774919  3.217481
## UIL316  1.1161151  3.957006
## UIL317  1.1582238  3.562973
## UIL318  1.4487723  3.246014
## UIL319  1.3853966  3.649291
## UIL320  1.3124810  4.295815
## UIL321  1.1718728  3.104274
## UIL322  1.0525933  2.094986
## UIL323  1.1712534  1.950083
## UIL324  0.9834272  1.841498
## UIL325  0.8818830  2.330502
## UIL326  1.2031503  3.534410

##
## Item-Fit Statistics and P-values
##
## Call:
## ltm(formula = norm_sum ~ z1, IRT.param = T)
##
## Alternative: Items do not fit the model
## Ability Categories: 10
##
##           X^2 Pr(>X^2)
## UIL310  0.0000      1
## UIL311  2.1774  0.9751
## UIL312  0.4417  0.9999
## UIL313  5.3071  0.7243
## UIL314  0.9114  0.9987
## UIL315  1.5975  0.991
## UIL316  0.3245      1
## UIL317  0.0000      1
## UIL318  0.0000      1
## UIL319  1.9065  0.9837
## UIL320  0.1495      1
## UIL321  0.0049      1
## UIL322 23.5461  0.0027
## UIL323  0.2053      1
## UIL324  0.0000      1
## UIL325  3.8880  0.8671
## UIL326  0.3038      1
```

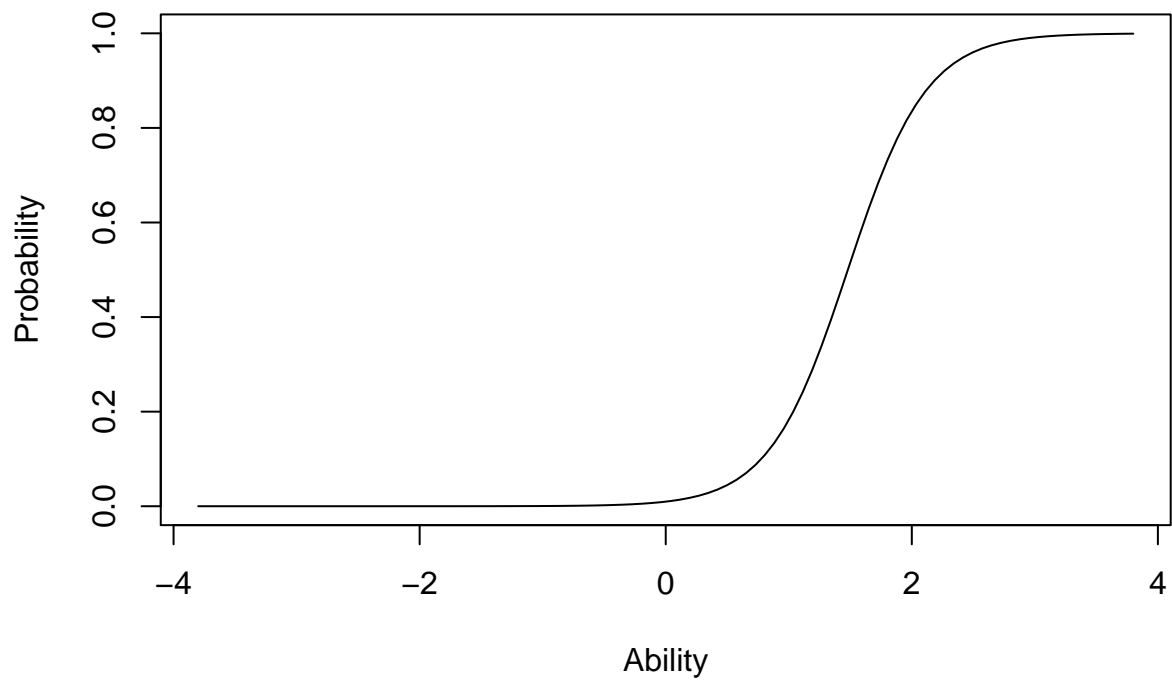
The difficulty (b) measure determines the underlying trait of Chrononormativity. The easiest way to think of these numbers are as z-scores. The set of items are roughly one standard deviation away from the mean underlying trait of Chrononormativity.

The discrimination (a) measure determines how accurate the item is at assessing how far above and below people the difficulty parameter. Cutoffs between 1 to 4 are usually good here. Items are discriminating well.

**Item Characteristic Curves**

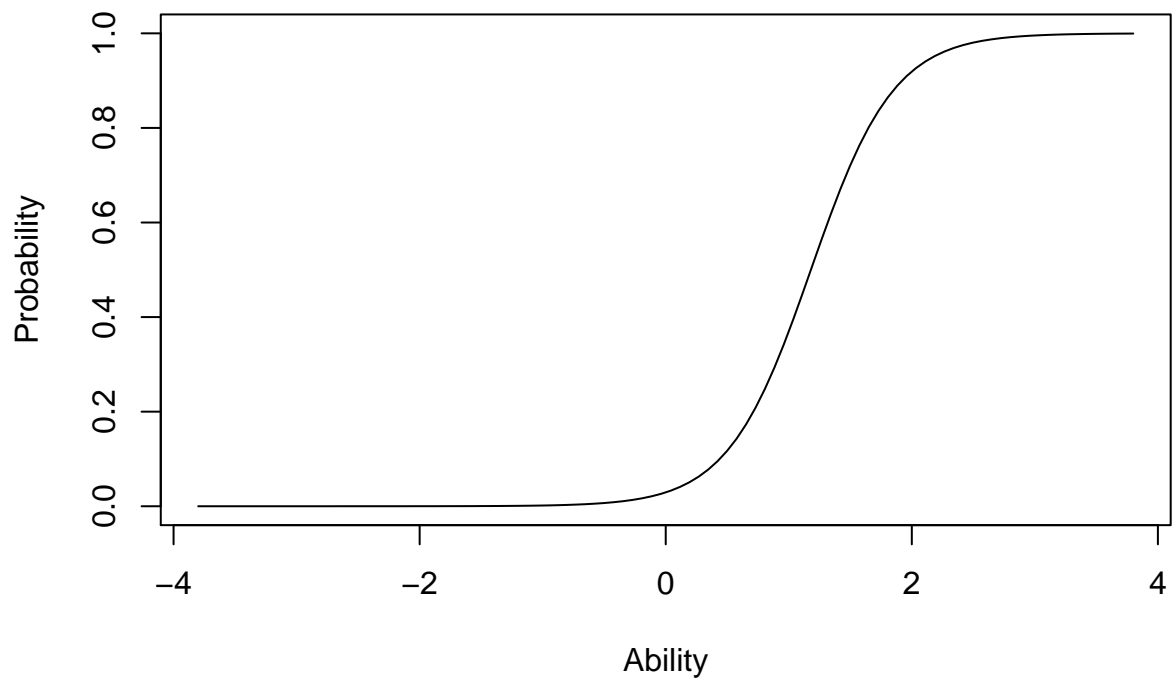


**Item Characteristic Curves**

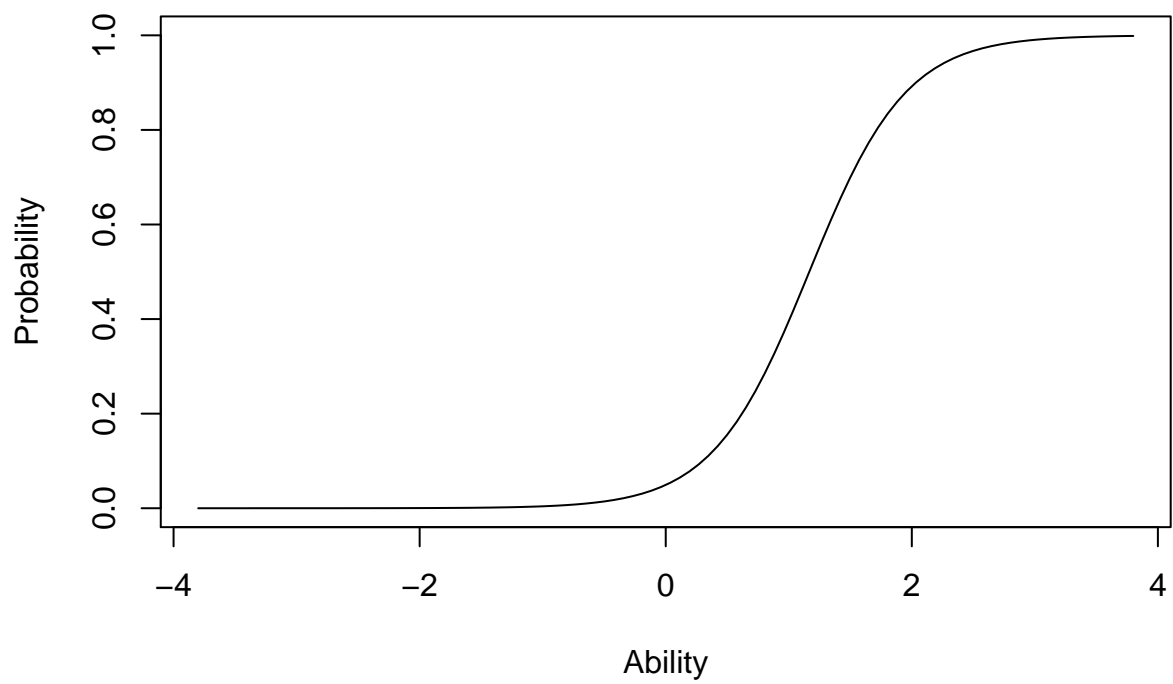




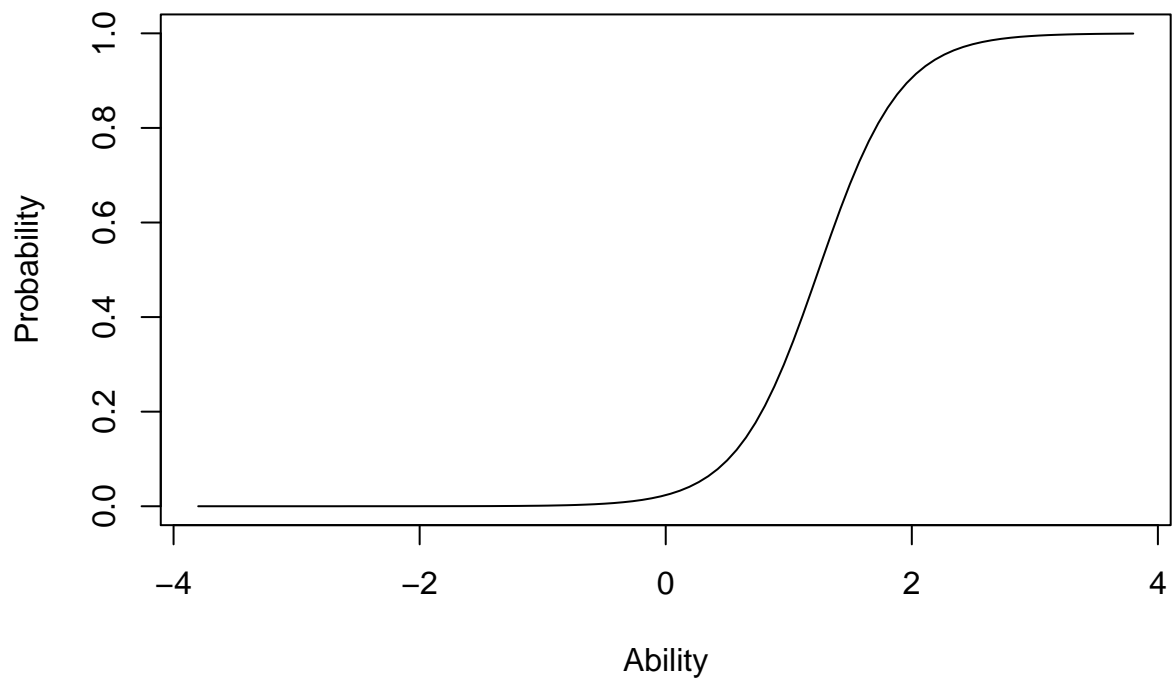
### Item Characteristic Curves



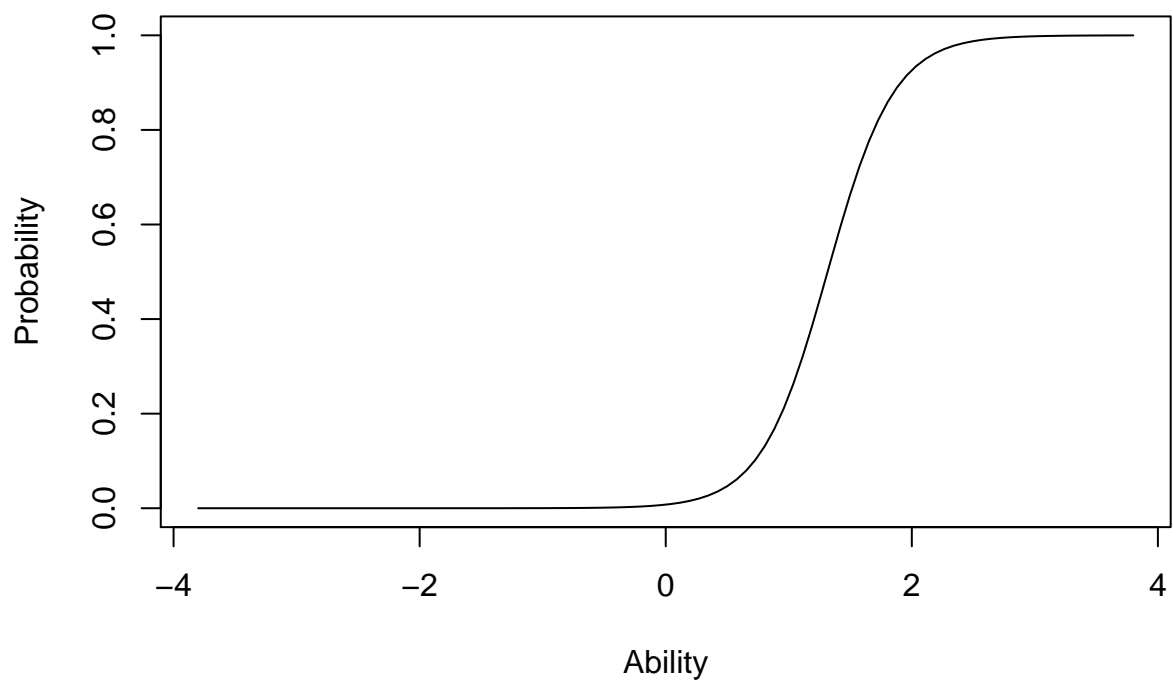
### Item Characteristic Curves



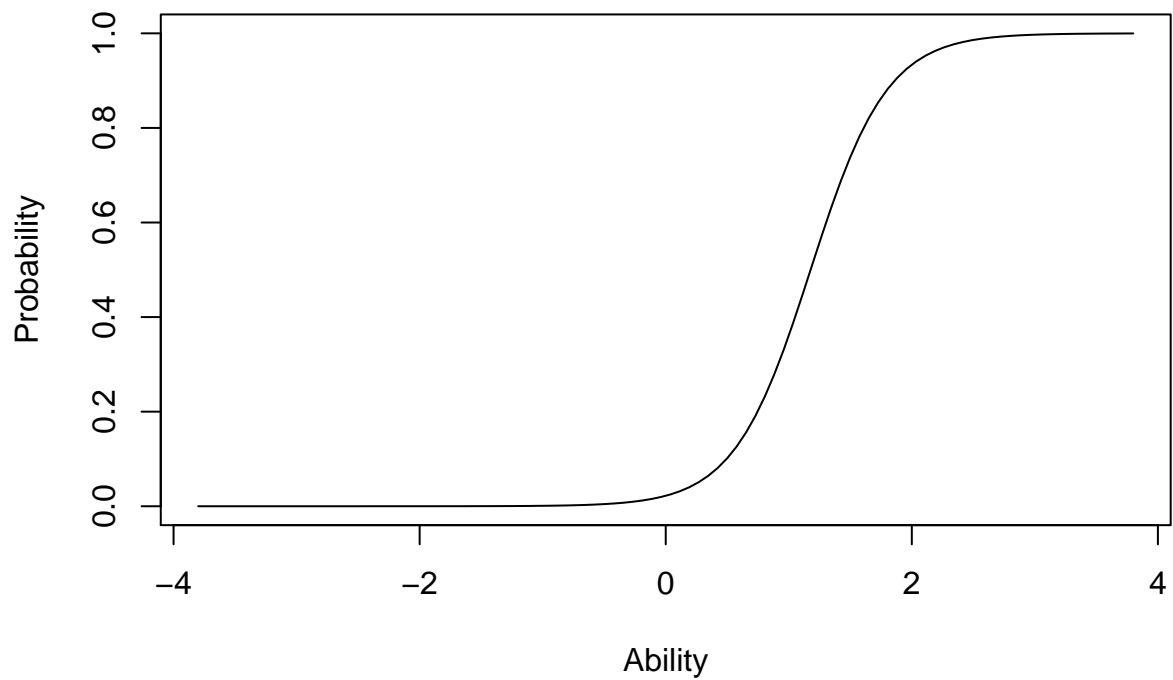
## Item Characteristic Curves



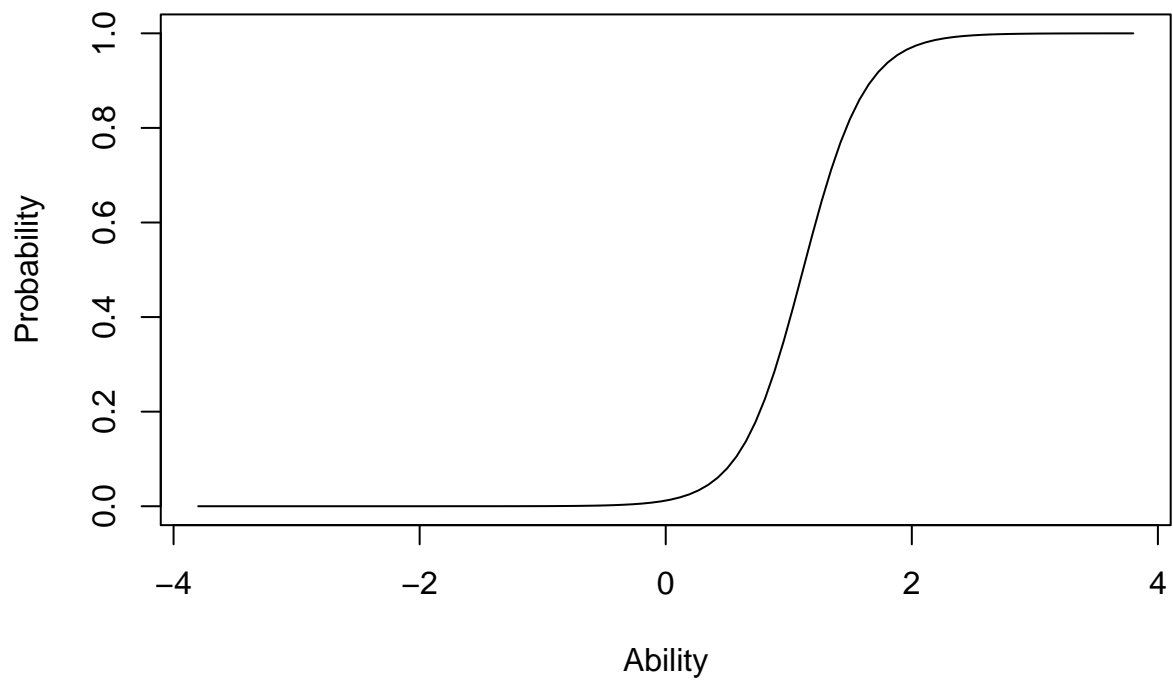
## Item Characteristic Curves



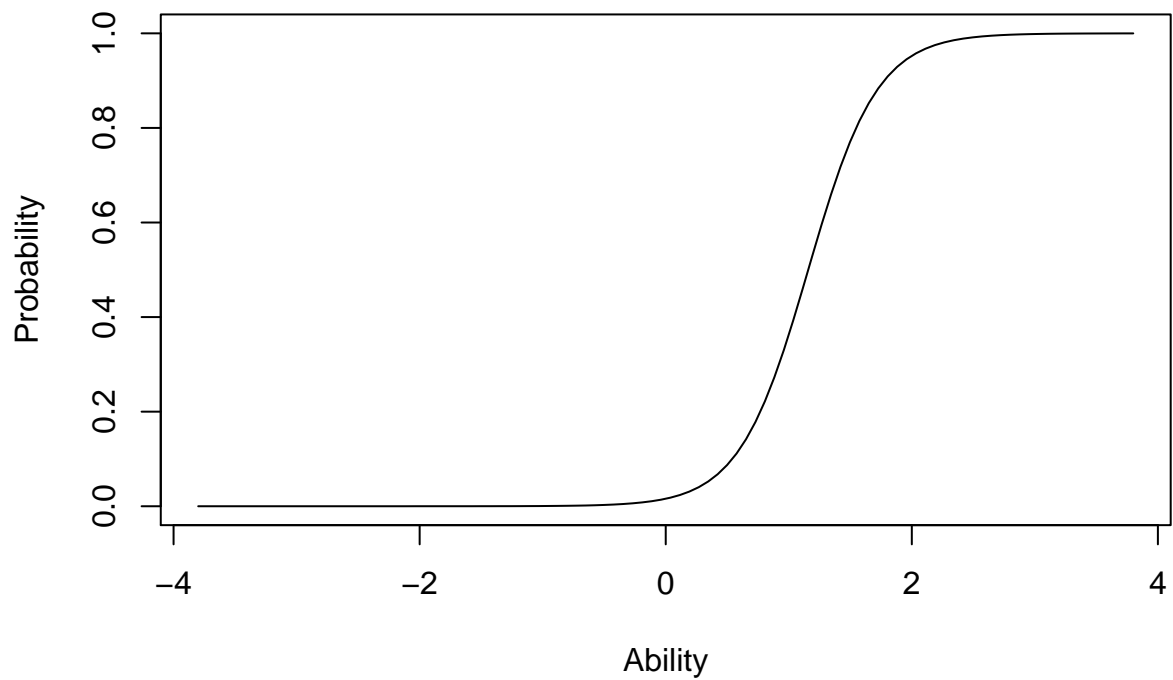
### Item Characteristic Curves



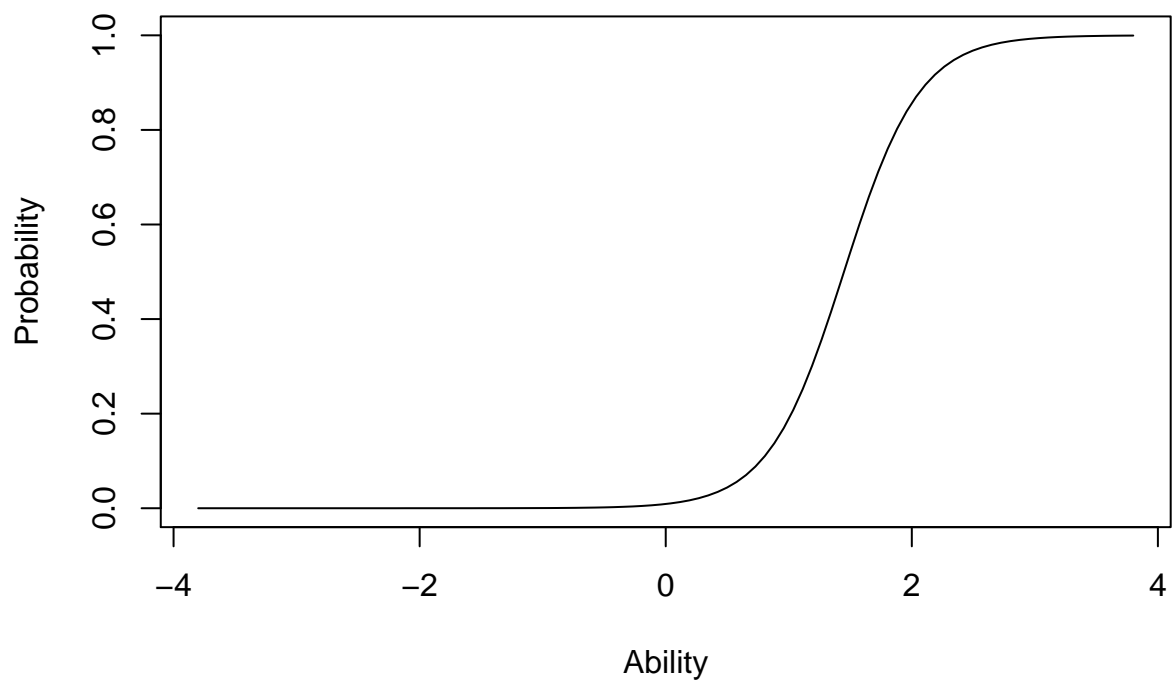
### Item Characteristic Curves



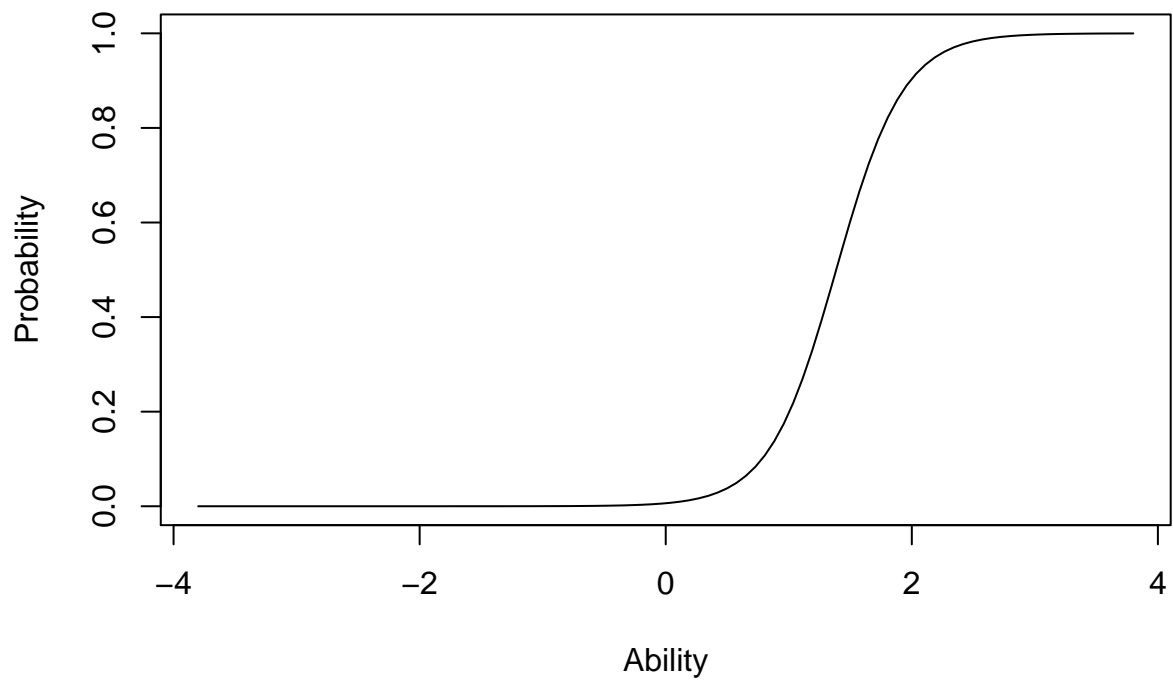
## Item Characteristic Curves



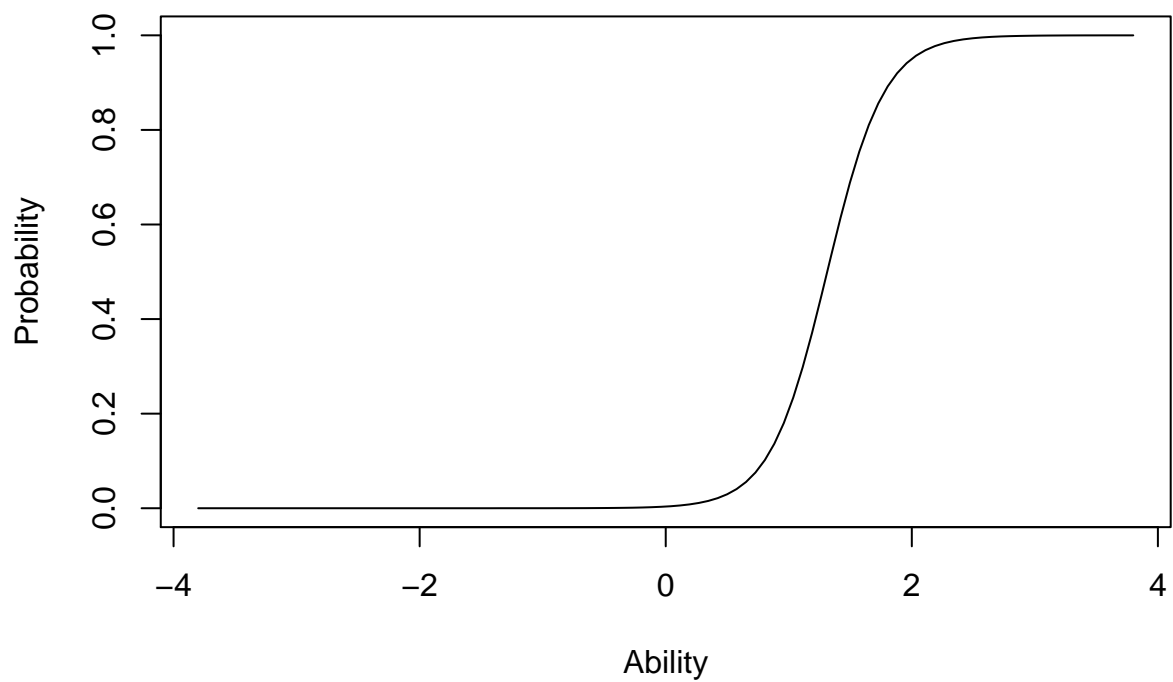
## Item Characteristic Curves



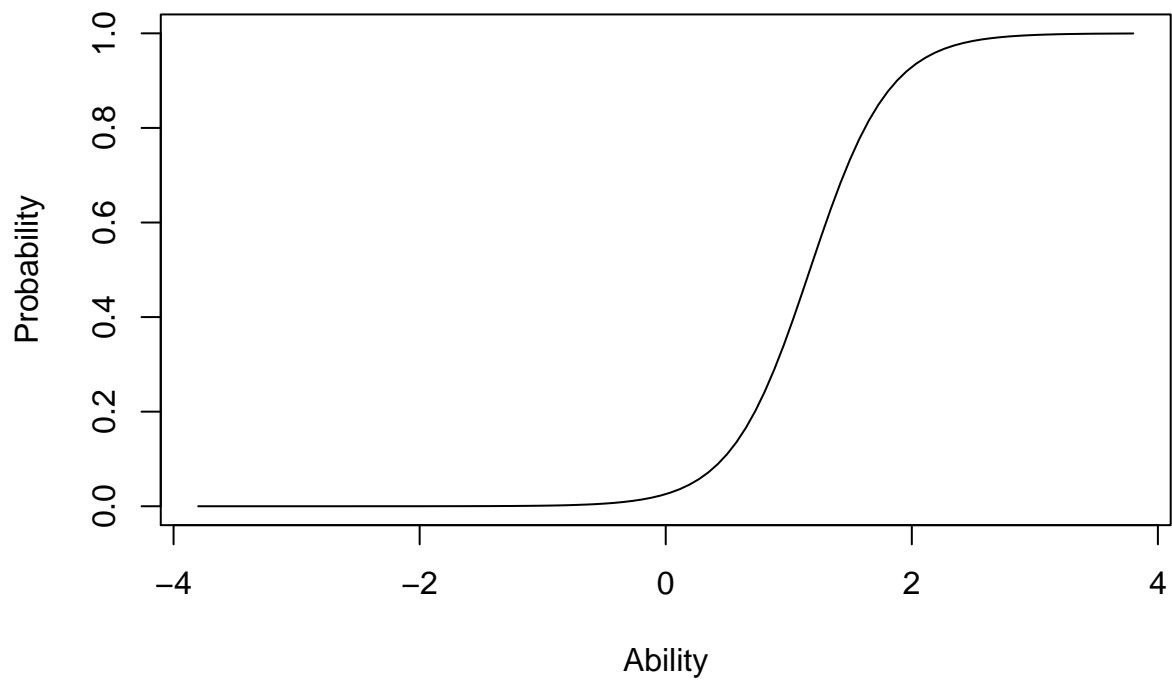
## Item Characteristic Curves



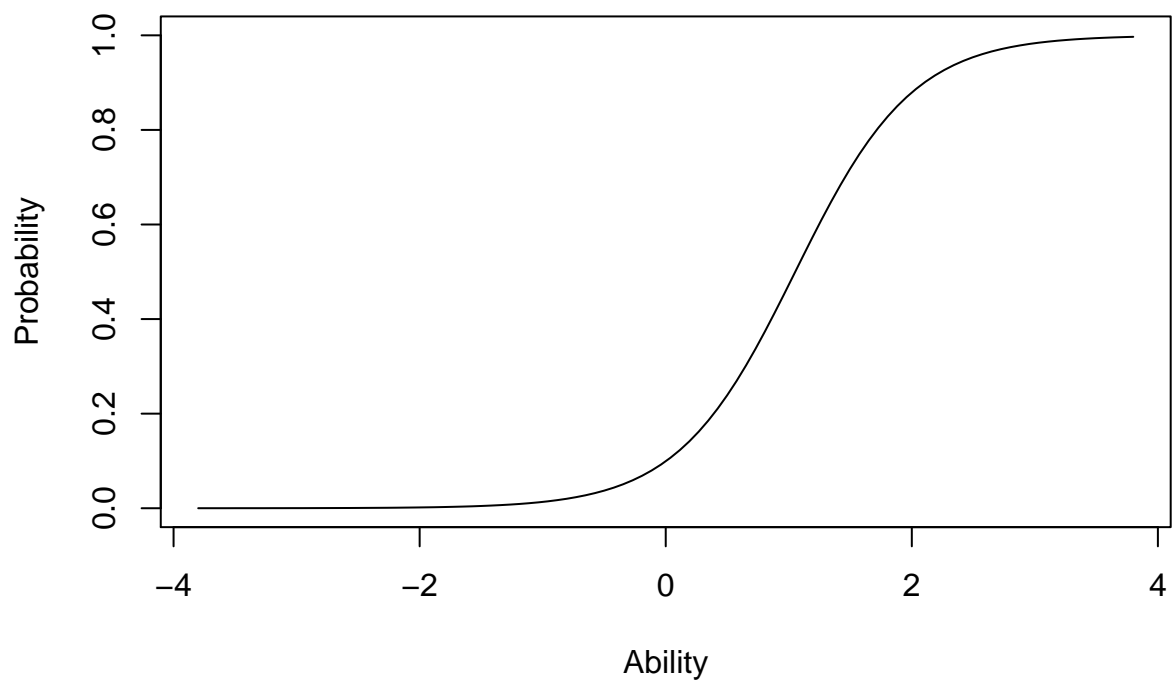
## Item Characteristic Curves



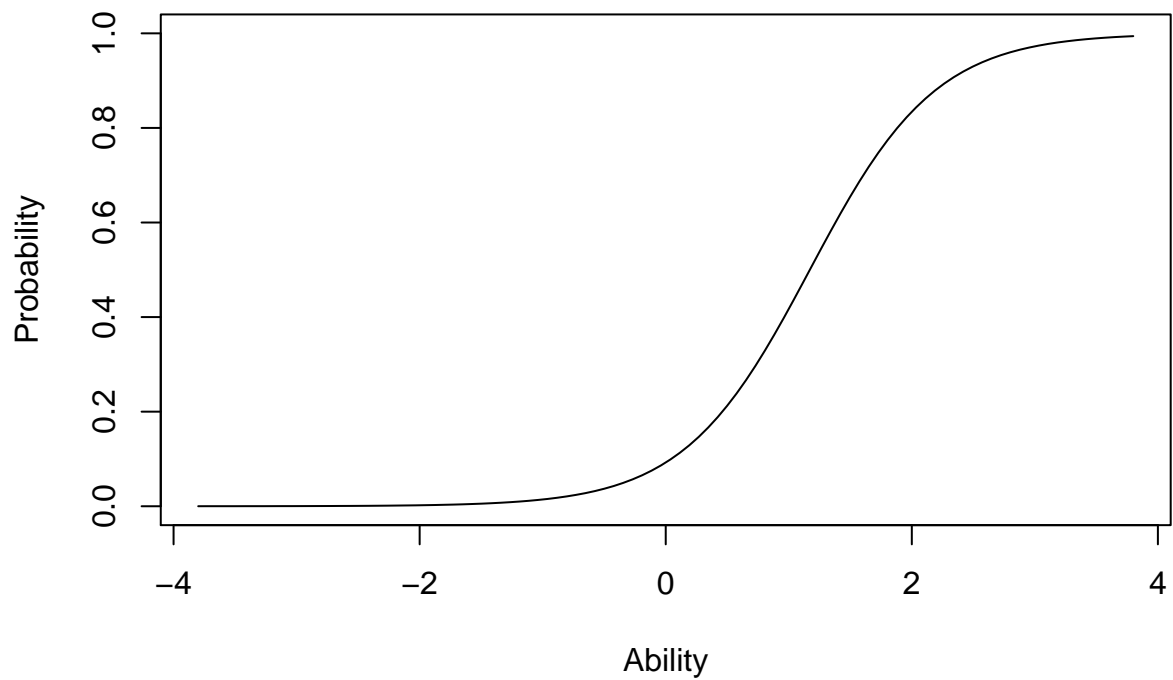
### Item Characteristic Curves



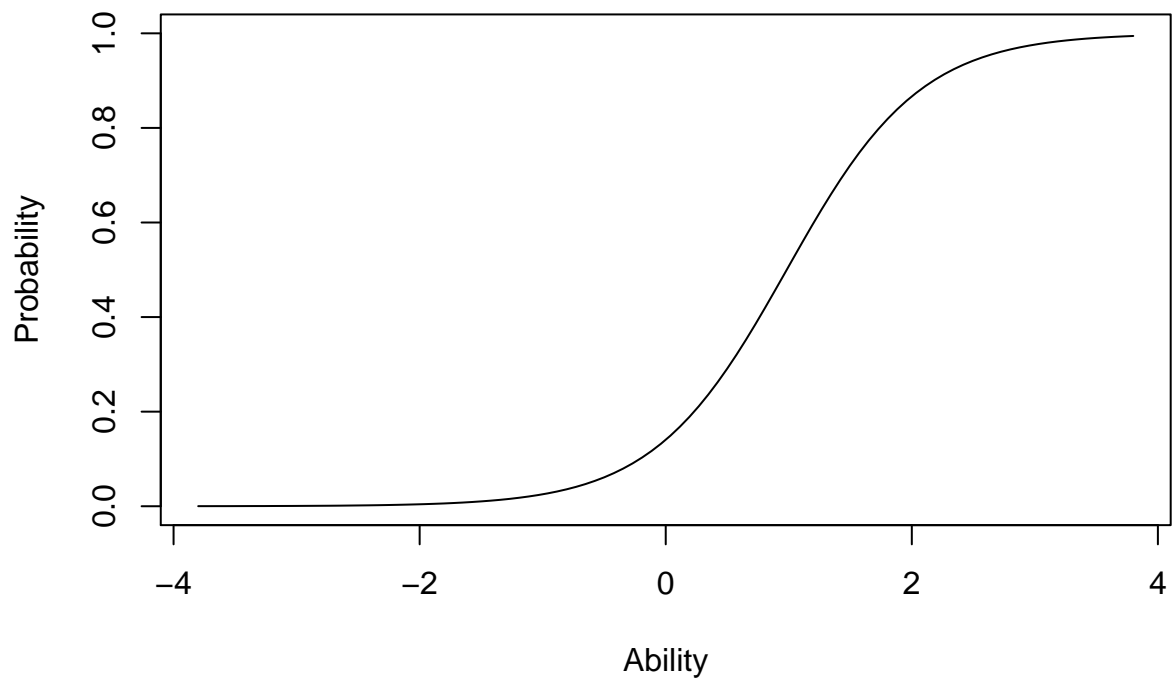
### Item Characteristic Curves



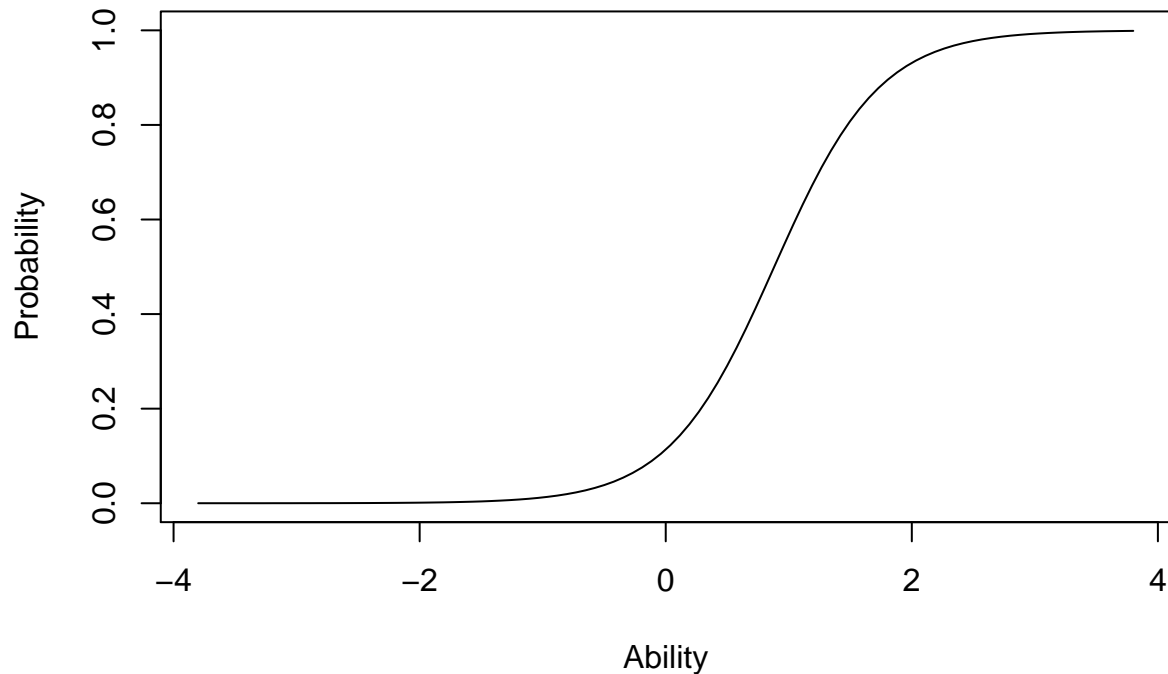
### Item Characteristic Curves



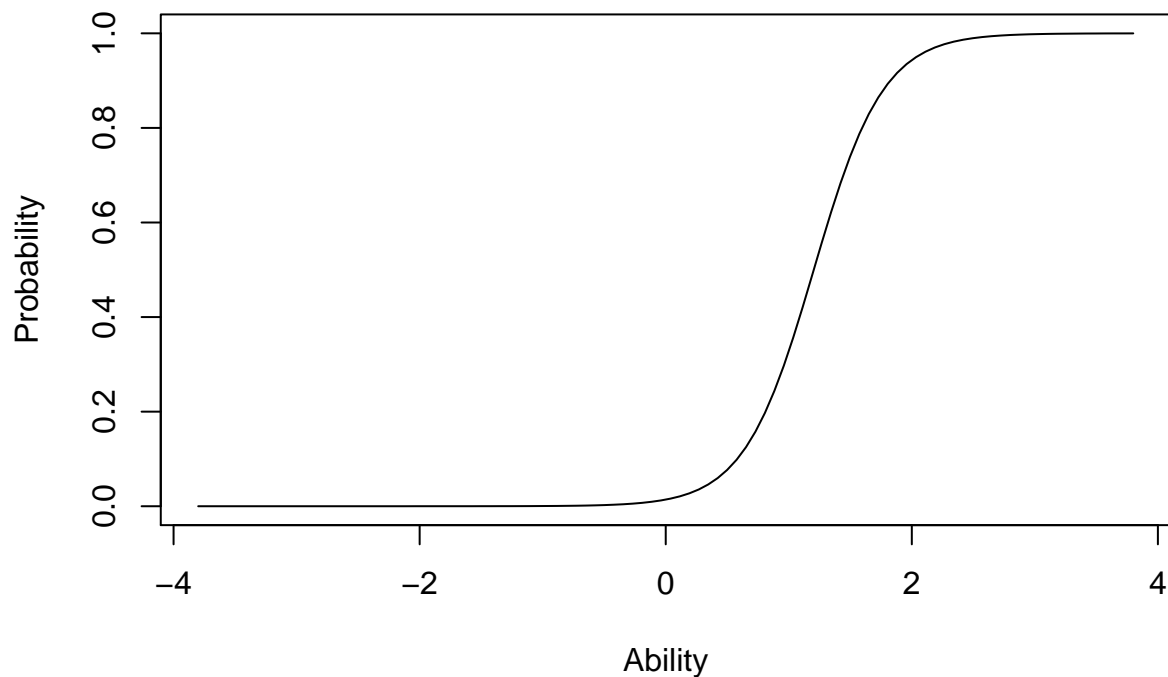
### Item Characteristic Curves



## Item Characteristic Curves



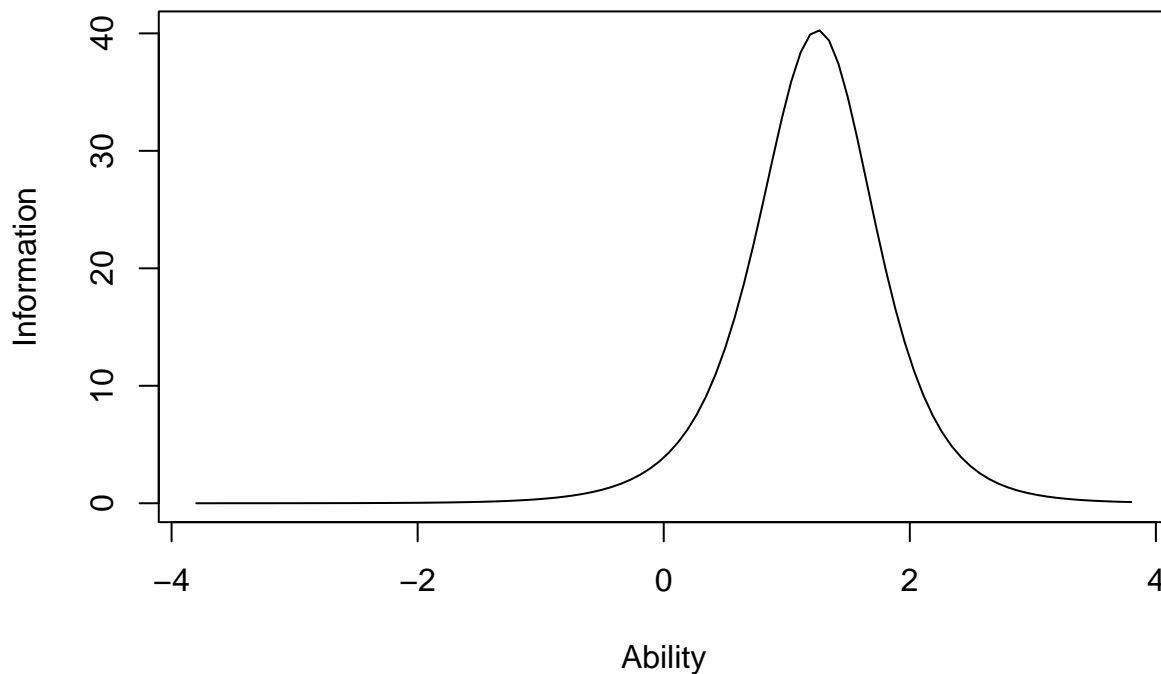
## Item Characteristic Curves



The Item Characteristics Curve represents the information in the table above graphically. The y-axis is the probability of a response representing the underlying trait of Chrononormativity. For example, suppose we have a 0.50 score on the y-axis that intersects with a line on the x-axis at 1. This would indicate that the item is capturing an average of one standard deviation for those who are less Chrononormative. The average score on ability is roughly one standard deviation away for all items.



## Test Information Function

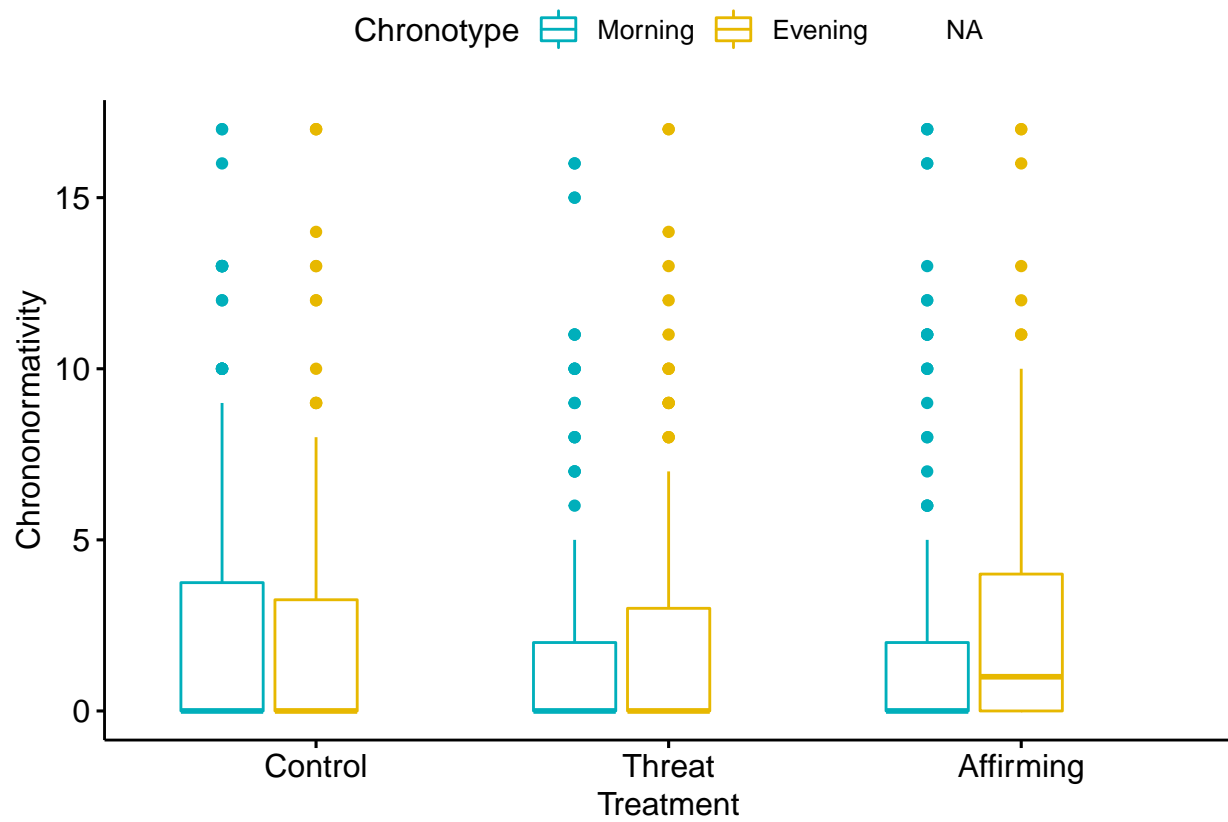


The Test Information Function graph takes all the items and determines the probability along each point for the underlying trait of Chrononormativity. This curve tells us where the most “information” is present. We are getting the most information at roughly one standard deviation away from the mean. We’re getting a lot of information about people who tend to score lower on Chrononormativity measures (do whatever you want whenever you want), so this set of items may not tell us the most about people who score higher on Chrononormativity measures (there are strict times of day you should do things.)

## Treatments & Control: Chrononormativity Mean Differences

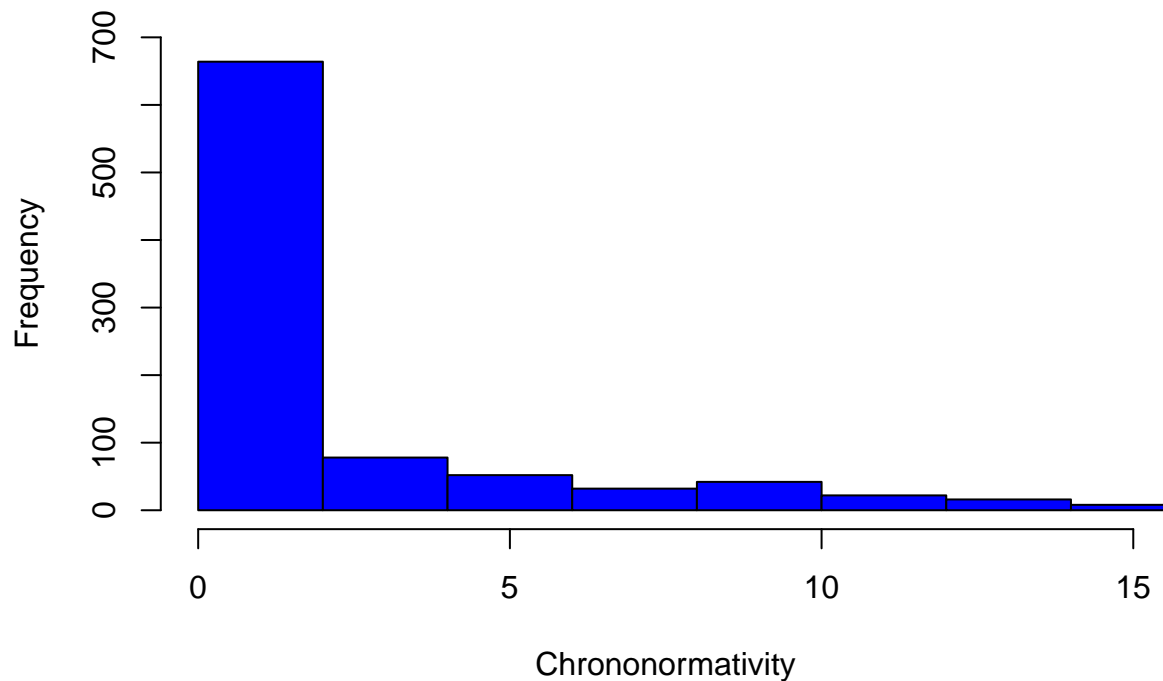
Summary of this section: it looks like there isn’t a statistically significant relationship based on the box-plot and table showing the means of the observations. It looks like one possible explanation is that a high number of participants are fine with people doing a lot of stuff whenever they want based on the histogram.

```
## `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        151  2.77  4.52
## 2 Control   Evening        152  2.31  3.87
## 3 Control   <NA>           28  2.58  4.15
## 4 Threat    Morning        162  1.98  3.61
## 5 Threat    Evening        149  2.33  3.70
## 6 Threat    <NA>           29  4.25  4.73
## 7 Affirming Morning        161  2.19  4.08
## 8 Affirming Evening        149  2.56  3.76
## 9 Affirming <NA>           19  4.47  5.64
```



```
##           Df Sum Sq Mean Sq F value Pr(>F)
## Treatment      2      22   10.823    0.698  0.498
## Chronotype      1       2    1.832    0.118  0.731
## Treatment:Chronotype  2      32   16.046    1.035  0.356
## Residuals    854   13238   15.501
## 140 observations deleted due to missingness
```

## Chrononormativity Responses



```
##              Df Sum Sq Mean Sq F value Pr(>F)
## Treatment      2    22  10.823   0.698  0.498
## Chronotype     1     2   1.832   0.118  0.731
## Treatment:Chronotype  2    32  16.046   1.035  0.356
## Residuals     854 13238  15.501
## 140 observations deleted due to missingness

## Anova Table (Type III tests)
##
## Response: Chrononormativity
##              Sum Sq  Df F value    Pr(>F)
## (Intercept)    1087.7   1  70.1665 2.224e-16 ***
## Treatment       48.2    2   1.5552   0.2117
## Chronotype      14.9    1   0.9642   0.3264
## Treatment:Chronotype  32.1  2   1.0352   0.3556
## Residuals     13238.1 854
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

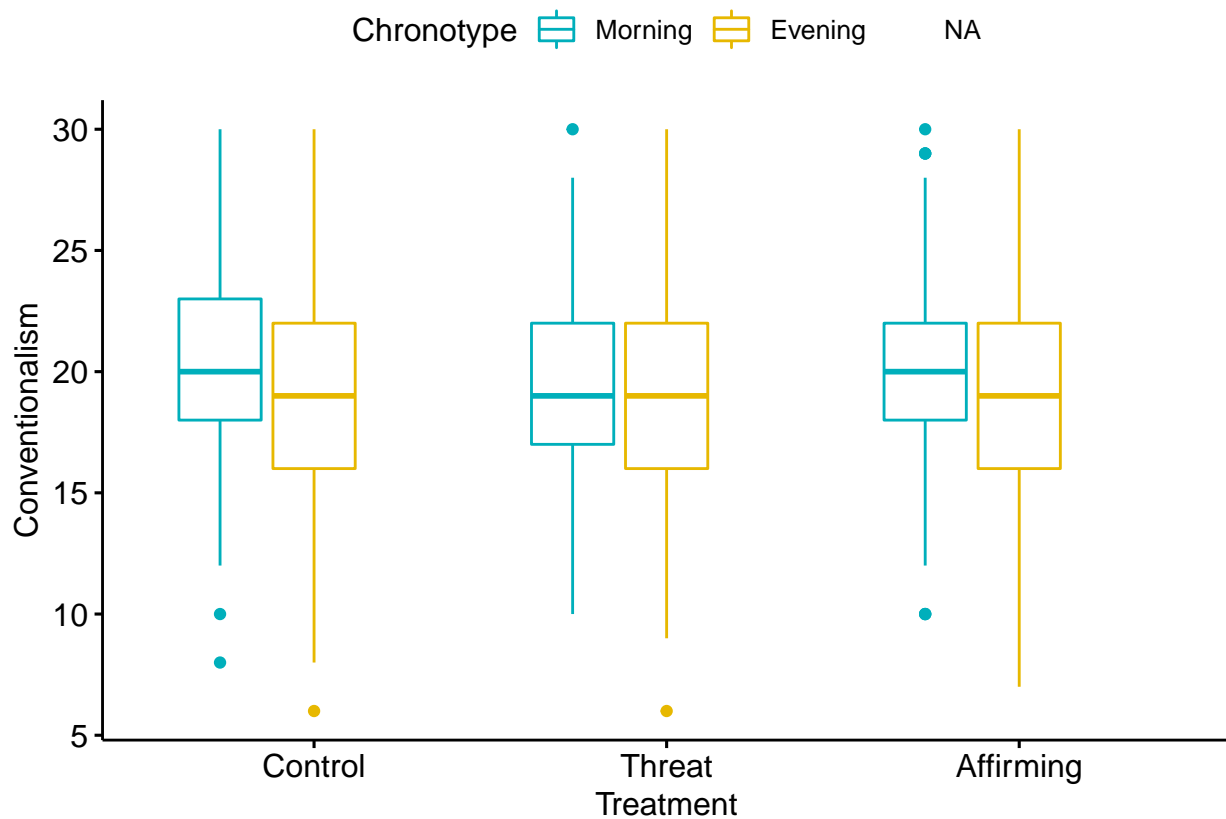
## `summarise()` has grouped output by 'Treatment'. You can override using the `.groups` argument.

## # A tibble: 9 x 5
## # Groups:   Treatment [3]
##   Treatment Chronotype count  mean    sd
##   <fct>      <fct>    <int> <dbl> <dbl>
## 1 Control  Morning     151  20.4  4.13
## 2 Control  Evening     152  19.1  4.25
## 3 Control  <NA>         28  20.4  5.62
## 4 Threat   Morning     162  19.5  3.67
## 5 Threat   Evening     149  18.9  4.64
## 6 Threat   <NA>         29  18.7  2.76
```

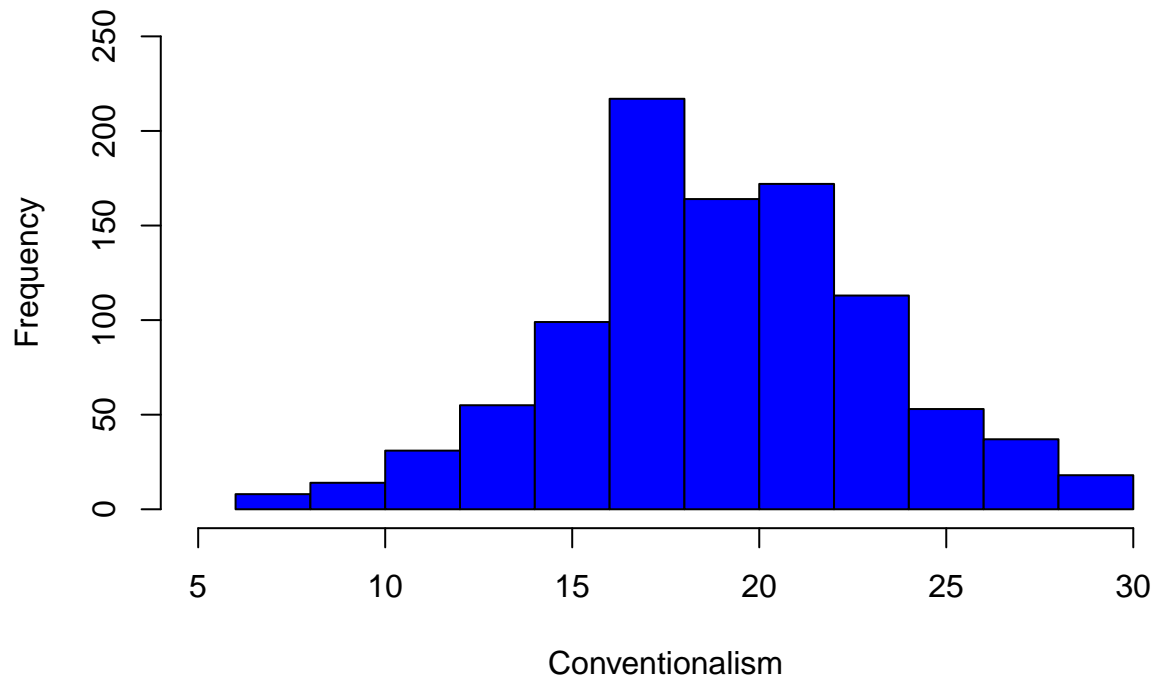
```
## 7 Affirming Morning      161  20.2  3.74
## 8 Affirming Evening     149  18.9  4.69
## 9 Affirming <NA>        19  19.5  3.86

## `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     151  24.3  6.32
## 2 Control    Evening     152  22.4  6.85
## 3 Control    <NA>         28  25.0  6.52
## 4 Threat     Morning     162  23.4  6.59
## 5 Threat     Evening     149  21.2  7.42
## 6 Threat     <NA>         29  21.5  5.67
## 7 Affirming Morning     161  23.5  6.42
## 8 Affirming Evening     149  22.1  6.06
## 9 Affirming <NA>        19  22.2  7.93
```

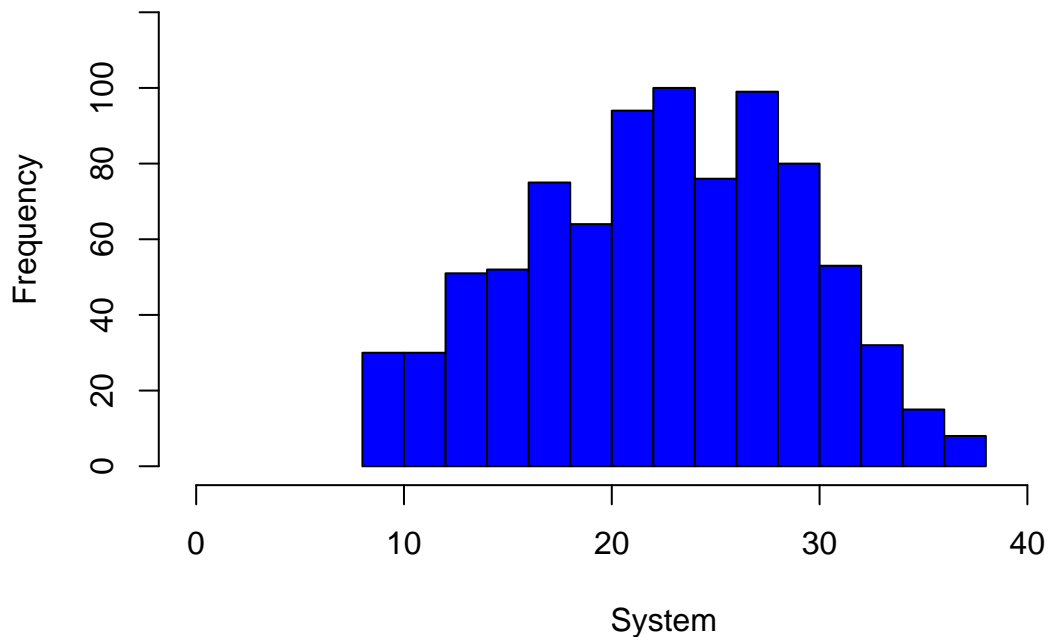


## Conventionalism Responses



```
##           Df Sum Sq Mean Sq F value    Pr(>F)
## Treatment      2    121     60.4    1.386 0.250768
## Chronotype      1     640    639.7   14.665 0.000139 ***
## Treatment:Chronotype  2      23     11.4    0.261 0.770710
## Residuals    793   34592     43.6
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 201 observations deleted due to missingness
```

## System Responses



```
two.way <- aov(Conventionalism ~ Treatment*Chronotype, data = anova1)
summary(two.way)
```

```
##              Df Sum Sq Mean Sq F value    Pr(>F)
## Treatment      2     40    20.03   1.138 0.320764
## Chronotype      1    259   258.50  14.691 0.000135 ***
## Treatment:Chronotype  2     26    13.18   0.749 0.473142
## Residuals     902   15872    17.60
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 92 observations deleted due to missingness
```

```
Anova(two.way, type = "III")
```

```
## Anova Table (Type III tests)
##
## Response: Conventionalism
##              Sum Sq Df   F value    Pr(>F)
## (Intercept)    61461  1 3492.8166 < 2.2e-16 ***
## Treatment        67   2   1.9166  0.147707
## Chronotype      131   1   7.4617  0.006426 **
## Treatment:Chronotype  26   2   0.7490  0.473142
## Residuals     15872 902
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
two.way <- aov(Conventionalism ~ Treatment*Chronotype, data = anova1)
summary(two.way)
```

```
##              Df Sum Sq Mean Sq F value    Pr(>F)
## Treatment      2     40    20.03   1.138 0.320764
```

```
## Chronotype          1      259  258.50  14.691 0.000135 ***
## Treatment:Chronotype 2       26   13.18   0.749 0.473142
## Residuals          902  15872   17.60
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 92 observations deleted due to missingness
```

```
Anova(two.way, type = "III")
```

```
## Anova Table (Type III tests)
##
## Response: Conventionalism
##              Sum Sq  Df  F value    Pr(>F)
## (Intercept)    61461   1 3492.8166 < 2.2e-16 ***
## Treatment         67   2   1.9166  0.147707
## Chronotype      131   1   7.4617  0.006426 **
## Treatment:Chronotype 26   2   0.7490  0.473142
## Residuals     15872 902
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```