

1 Excises in RaschOnline with ten-week courses

2 Step 1: Select visual display

3 Step 2 & 3: confirmation of
4 selections and copy-paste data

5 Step 4: visual displays and results

6 Step 1

(Select graph)

MP4 Video
Rasch Analysis
Outfit/Infit MNSQ
Summart Table
ANOVA 1
Wright Map
Wright Map(Groups)
KIDMAP

Step 2

(Paste data from MS Excel)

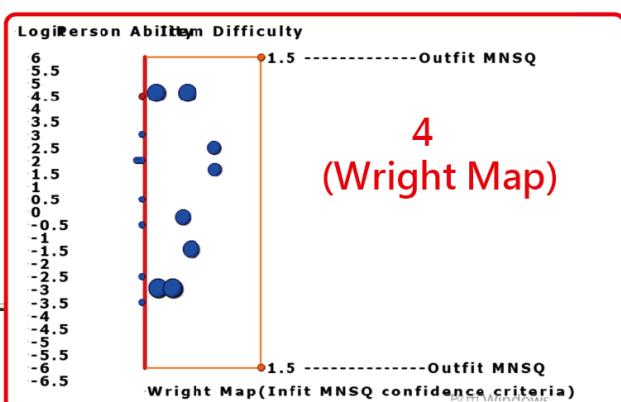
Item1	item2	Item3	Item4	Item5	Item6	Item7	Item
8	Item9	Item10	name	group			
.	1	1	1	1	1	1	1
0	1	Student1		1			
1	1	1	1	1	1	1	0
1	0	Student2		1			
1	1	1	1	1	1	0	1
0	0	Student3		1			
1	1	1	1	1	0	1	1
0	0	Student4		0			
1	1	1	1	1	1	0	1
0	0	Student5		0			
1	1	1	1	1	0	1	0
0	0	Student6		1			
1	1	1	1	0	1	0	0

2

Step 3

(Submit if no other settings) (Show results or visual displays)

Visual displays Wright Map
KIDMAP person# 1
Bubble Size 3
3 Submit
WrightMap dotted with dashes Yes
Fit Types Outfit MNSQ
Wright move to left 0
ICC Item# 1
Group# 1



RaschOnline:

<http://raschonline.healthup.org.tw/>

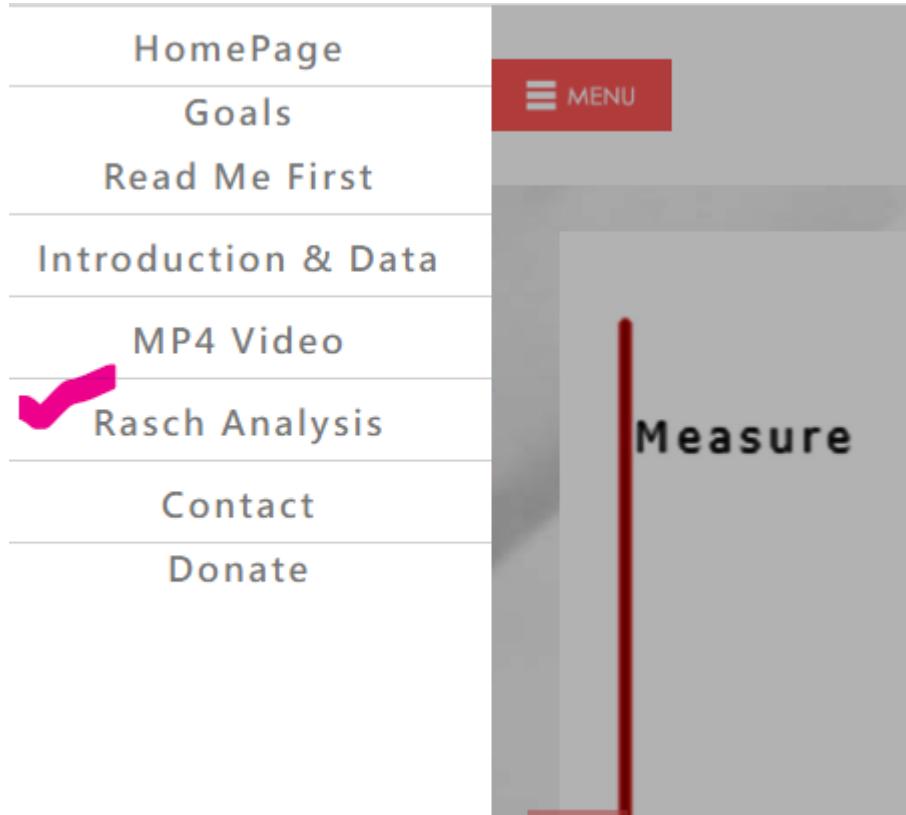
8

9 <http://raschonline.healthup.org.tw/>

10 A. Dichotomous response(No missing): 1st week

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Item1	item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10	Item11	Item12	Item13	Item14	Item15	Item16	name	group	
2	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0	0	Modelled/Id	1011	
3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	Guttman/Def	1111	
4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1110	
5	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0000	
6	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0000	
7	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1110	
8	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	1011	
9	1	1	1	1	0	1	0	1	1	0	0	1	0	0	0	0	0	1111	
10	1	1	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0000	
11	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0000	
12	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0000	
13	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0000	
14																			
15																			
16																			

- 11
12 Copy and paste the responses in Excel, including labels of name and group and
13 corresponding head labels.



- 14
15 With the icon of Infit/outfit results shown above, paste responses and data to the
16 input box of RaschOnline, as shown below:

Item1	item2	Item3	Item4	Item5	Item6	Item7	Item8
Item9	Item10	Item11	Item12	Item13	Item14	Item15	Item16
name	group						
1	1	1	0	1	1	0	1
1	0	1	0	0	0	0	0
Modelled/Ideal	1.0	1.1	1.0	1011			
1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0
Guttman/Deterministic	0.3	0.5	1.8	1111			
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
Miscode	12.6	4.3	3.5	1110			
0	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0
Carelessness/Sleeping	3.8	1.0	1.9	0000			

Copy data and Paste them onto the box from Spread sheet
Click on the submit bottom, the Result immediately appear:

Visual displays

KIDMAP person#

Bubble Size

Fit Types

17

O	P	Q	R	S
Item15	Item16	name	group	
)	0	0	Modelled/Ide	1011
)	0	0	Guttman/Def	1111
.	1	1	Miscode 12.6	1110
)	0	0	Carelessness	0000
)	0	1	Lucky Guess	0000
)	1	0	Response se	1110
)	0	0	Special know	1011
)	0	0	Imputed.outl	1111
)	0	0	low discrim	0000
)	0	0	high discrim	0000
)	0	0	very high dis	0000

18

19 Particularly on the label of group, including multi-groups, we click on the submit icon
20 and obtain the results below.

12=rows(including head labels)
 the number of persons=1 - 11




```

category_number=2, Max.=1, Min.=0 Cat. number Type(1=threshold)=4=RSM
Ranking
Residuals=0 previous vs. after= 0 Residuals=0.01 previous vs. after= 0.09 Steps...1 difficulty=0
iteration...
3
Strata item = All items
Strata      Sum(n*k) Mean Expected Variance
C_1          88   176   0.5   88.01   32.83
ChSq=        0.03 df= 0 prob.= 0
Ref. in Eq 4(click)
Strata_raw score item=1
Strata      Sumn  Mean Expected Variance
C_1          9    11   0.82   8.98   1.65
ChSq=        0    df= 0 prob.= 0
Ref. in Eq 4(click)

```

21
 22 Total rows=12, including head labels. The maximum response=1 and the person
 23 number=11.
 24 Category number=2(i.e., 0 and 1): maximum=1, and minimum =0. The type of
 25 model is based on RSM(rating scale model).
 26 Model residuals are ended at the deviation between previous and after residual
 27 smaller than a criterion of 0.05. The step threshold =1(i.e. categories of 0 and 1). The
 28 step difficulty=0.
 29 By dividing strata into five stratum by logit scores (e.g., >2,0.5,-0.5,2), there are
 30 one stratum only in this dataset with a summation score of 88. The model data fit
 31 can not be computed due to df=0(see the reference at
 32 <https://jsdajournal.springeropen.com/articles/10.1186/s40488-020-00108-7> with
 33 Equation 4). The counts in the stratum of C_1 is 175 that is computed by df*k, where
 34 k is the item length mentioned at the link above.
 35 On the bottom, we see the model data for item# 1 which is assigned at the
 36 previous conformation step. The model data fit is obtained via the way shown in the
 37 table.
 38
 39 Notes that the strata are computed and assigned the labels as programs below:
 40
 41 kidat=round((6-person(jk))*2,0) ' person(jk)=person measure
 42 if kidat<0 then kidat=0
 43 if kidat>25 then kidat=25
 44 ranking=Fix(kidat/5)+1
 45 alpheta="ABCDEFGHIJK"
 46 remainder=kidat mod 5
 47

```

48      rk=mid("ABCDEFGJIJK",ranking,1)  ' & right("0" & (remainder+1),2)
49          personrk(jk)=rk  'assigning the label the person
50          if instr(rktext, rk)=0 then
51              rktext=rktext & rk
52          end if
53          cutting(ranking)=cutting(ranking) +round(person(jk),2)
54          ' used to compute the mean measures in each stratum, which is used in
55 drawing the ICC later.
56
57

```

												Category
N	Perso	Grad	Thet	Model	SInfit	MNS	Outfit	MNS	Chi_	Raw		
o.	n	e	a	E	Q	Q	q	re				
1	1	C03	0	0.58	0.66	0.56	1	8				
2	1	C03	0	0.58	0.66	0.58	1	8				
3	1	C03	0	0.58	2.71	3.31*	0	8				
4	0	C03	0	0.58	0.72	0.7	1	8				
5	0	C03	0	0.58	0.84	0.82	1	8				
6	1	C03	0	0.58	1.26	1.25	1	8				
7	1	C03	0	0.58	1.08	0.96	1	8				
8	1	C03	0	0.58	0.84	0.75	1	8				
9	0	C03	0	0.58	0.84	0.73	1	8				
10	0	C03	0	0.58	0.84	0.75	1	8				
11	0	C03	0	0.58	0.47	0.40	1	8				

```

58
59 Note. the Grade label is defined in the previous code mentioned in notes.
60
61 Person estimations are listed above by series of number, group label, groups by
62 measures in logit(i.e., C03 is around at Zero logit. Theta is person measure(e.g., all at
63 zero logit). Model SE(standard error=sqrt(1/variance for person)). Infit and Outfit
64 MNSQs are followed. * indicates significant higher than 2.0. Chisquare is the results of
65 summation of squared Zscore(=[(obs.-exp)/SD]^2) based on chiSQ test.

```

ANOVA	Virable	SS	df	MSS	F	p
	Between	0	1	0	0	=FDIST(0,1,9)
	Within	0	9	0		p-value(Click on Me)
	TSS	0	10		All mean=	0.5

```

66
67 ANOVA for groups F(0,1,9) and check the probability at
68 https://www.socscistatistics.com/pvalues/fdistribution.aspx

```

F-ratio value:
DF- numerator:
DF- denominator:

Significance Level:

- .01
 - .05
 - .10

The *p*-value is 1. The result is *not* significant at $p < .05$.

69

Calculate

70

Indicating that no difference is found between the two groups.

O	P	Q	R	S
Item15	Item16	name	group	
1	0	0 Modelled/Ide	1011	
1	0	0 Guttman/Dif	1111	
.	1	1 Miscode 12:	1110	
1	0	0 Carelessness	0000	
1	1	1 Lucky Guess	0000	
1	1	0 Response se	1110	
1	0	0 Special know	1011	
1	0	0 Imputed outl	1111	
1	0	0 low discrimin	0000	
1	0	0 high discrimin	0000	
1	0	0 very high dis	0000	

71

72

It is worth noting that the group is based on the first digit in group contents.

Bubble Size | 3

Submit

Fit Types Outfit MNSQ ▾

adjustwright Wright move to left 0

ICC Item# 1

Group#

73

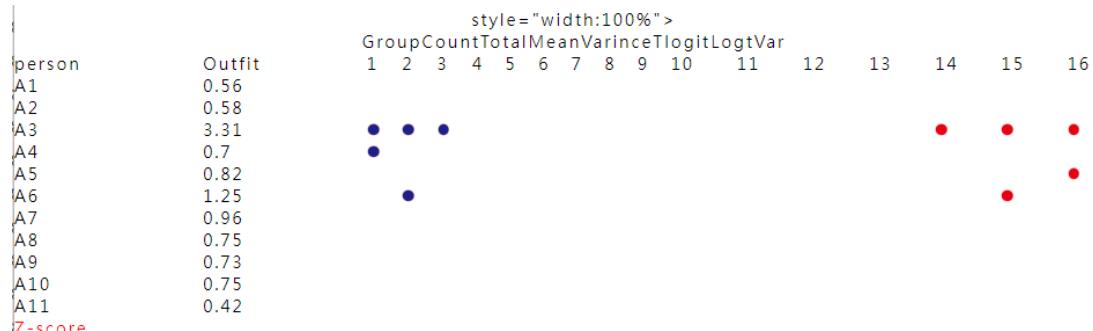
74

If the group label of two is selected, the ANOVA would be different:

1/5						
ANOVA	Virable	SS	df	MSS	F	p
	Between	0	1	0	0.31	=FDIST(0.31,1,9)
	Within	0	9	0		p-value(Click on Me)
	TSS	0	10	All mean =		0.5

75

76 In F test, we observe that the two of 0.31 vs. 0 when compared to the previous group
 77 defined in the selection of group definition in combo box in the confirmation step.
 78



79 **Z-score**
 80 Unexpected responses are shown in black and red bubbles, indicating under
 81 expectation(in black) and over expectation(in red), ie. Zscore=(obv. –
 82 exp.)/SD>2.0=over expectation and <-2.0 indicating under expectation.

Z-score																	
Person	Outfit	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
A1	0.56	0.47	0.47	0.34	-1.32	0.61	0.76	-1.1	1.1	0.61	-0.61	1.1	-0.61	-0.61	-0.34	-0.48	-0.48
A2	0.58	0.47	0.47	0.34	0.76	0.61	0.76	0.91	1.1	-1.63	-0.61	-0.91	-0.61	-0.61	-0.34	-0.48	-0.48
A3	3.31	-2.11	-2.11	-2.95	-1.32	-1.63	-1.32	-1.1	-0.91	0.61	1.63	1.1	1.63	1.63	2.95	2.11	2.11
A4	0.7	-2.11	0.47	0.34	0.76	0.61	0.76	0.91	1.1	0.61	-0.61	-0.91	-0.61	-0.61	-0.34	-0.48	-0.48
A5	0.82	0.47	0.47	0.34	0.76	0.61	0.76	0.91	-0.91	-1.63	-0.61	-0.91	-0.61	-0.61	-0.34	-0.48	2.11
A6	1.25	0.47	-2.11	0.34	-1.32	0.61	-1.32	0.91	-0.91	0.61	-0.61	1.1	-0.61	1.63	-0.34	2.11	-0.48
A7	0.96	0.47	0.47	0.34	0.76	-1.63	-1.32	-1.1	-0.91	0.61	1.63	1.1	1.63	-0.61	-0.34	-0.48	-0.48
A8	0.75	0.47	0.47	0.34	0.76	-1.63	0.76	-1.1	1.1	0.61	-0.61	-0.91	1.63	-0.61	-0.34	-0.48	-0.48
A9	0.73	0.47	0.47	0.34	-1.32	0.61	-1.32	0.91	-0.91	0.61	-0.61	1.1	-0.61	1.63	-0.34	-0.48	-0.48
A10	0.75	0.47	0.47	0.34	0.76	0.61	0.76	-1.1	1.1	-1.63	1.63	-0.91	-0.61	-0.61	-0.34	-0.48	-0.48
A11	0.42	0.47	0.47	0.34	0.76	0.61	0.76	0.91	-0.91	0.61	-0.61	-0.91	-0.61	-0.61	-0.34	-0.48	-0.48

83 Unexpected responses are shown in Zscores in green and red font.

```
corr_k is the average (Spearman) correlation coefficient computed on the ranks of all pairs of raters.
http://www.real-statistics.com/reliability/kendalls-w/
Kendall_dfchisquare(Col=item ,row for ju corr_k for Cronban alpha (Col=persons Cronban alpha(Col=item, in tradit
w dge)
W on)
ion)
0.2 =round(pro,2) 0.12 0.72 0
5
```

86 Cronban's alph for items and persons in 0.72 and 0. Respectively.

87 The Kendall coefficient refers to [https://www.real-](https://www.real-statistics.com/correlation/kendalls-tau-correlation/)
 88 [statistics.com/correlation/kendalls-tau-correlation/](https://www.real-statistics.com/correlation/kendalls-tau-correlation/)

Person	Infit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A1	0.66	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0	0
A2	0.66	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
A3	2.71	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
A4	0.72	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
A5	0.84	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1
A6	1.26	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
A7	1.08	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
A8	0.84	1	1	1	1	0	1	0	1	1	0	0	1	0	0	0	0
A9	0.84	1	1	1	0	1	0	1	0	1	0	1	0	1	0	0	0
A10	0.84	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0
A11	0.47	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0

89 if Crashed then Refresh

90 Unexpected response with original data

91

N	Ite	Difficult	Model S	InfitMNS	OutfitMNS	Raw Scor	Score
o.	m	y	E	Q	Q	e	t
1		-1.51	0.78	0.99	0.99	9	
2		-1.51	0.78	0.99	0.99	9	
3		-2.3	0.99	0.9	0.9	10	
4		-0.56	0.63	1	1	7	
5		-0.98	0.68	1	1	8	
6		-0.56	0.63	1	1	7	
7		-0.19	0.61	1	1	6	
8		0.18	0.61	1	1	5	
9		-0.98	0.68	1	1	8	
10		0.98	0.68	1	1	3	
11		0.18	0.61	1	1	5	
12		0.98	0.68	1	1	3	
13		0.98	0.68	1	1	3	
14		2.29	0.99	0.9	0.9	1	
15		1.5	0.78	0.99	0.99	2	
16		1.5	0.78	0.99	0.99	2	

92 Item difficulties are listed with measures, SE, Infit and Outfit MNSQs. The correlation coefficient between raw scores and item difficulties is negative. A high raw score has
93 a lower item difficulty.
94
95

Visual displays

KIDMAP person#

Bubble Size

Fit Types

adjustwright Wright move to left

ICC Item#

Group#

96
97 If summary table is selected, the results are shown below:

Person	RAW_SCOUNTMEAS.	SE	Infit	Outfit
MEAN	8 16 0	0.58	0.99	0.98
S.D.	0.1 0 0.1	0.33	0.58	0.77
MAX.	8 16 0	0.58	2.71	3.3
MIN.	8 16 0	0.58	0.47	0.4
REAL RMSE	0.63 ADJ.SD 0.03	SEPARATION 0.05	Person RELIAB.0	
MODEL RMSE	0.85 ADJ.SD 0.03	SEPERATION 0.05	Person RELIAB.0	
Cronbach's alpha=	0.72 Step delta=			
	0			
Item	RAW_SCOUNTMEAS.SE	Infit	Outfit	
MEAN	5.5 11 0 0.72	0.98	0.98	
S.D.	2.81 0 1.25 0.13	0.1	0.1	
MAX.	10 11 2.29 0.99	1	1	
MIN.	1 11 -2.3 0.61	0.9	0.9	
REAL RMSE	0.73 ADJ.SD 1.02	SEPARATION 1.4	Item RELIAB.0.66 啟用 Windows	
MODEL RMSE	0.85 ADJ.SD 1.01	SEPERATION 1.38	Item RELIAB.0.66 移至 [設定] 以啟用 Wind	

98
99 Person reliability (top) and item reliability(bottom) are shown at the right-hand

100 bottom, with 0 and 0.66, respectively. Notes that the reliability is Rasch reliability
101 rather than the Cronban's alpha shown in the previous section.
102 (It is worth learning how to compute those values in Table of person and item
103 parameters. Any further information is to read relevant references in Rasch analysis
104 or refers to Winsteps Manual for readers.

Visual displays ANOVA

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

105
106 If ANOVA is selected, the results shown below are identical to the previous ANOVA in
107 the previous section based on the group 1 in the label of input data.

ANOVA	Virable	SS	df	MSS	F	175	p
	Between	0	1	0	0		=FDIST(0,1,9)
	Within	0	9	0			p-value(Click on Me)
	TSS	0	10		All mean=		0.5

108

109 B. Basic computations in Rasch (In 2nd 110 week)

111 1. How to compute Rasch person separation index and

112 reliability

113 Reliability and separation of measures at

114 <https://www.winsteps.com/winman/reliability.htm>

$$115 G_p = \frac{SA_p}{SE_p}, \quad (1)$$

116 G_p=person separation index

$$SE_p = (MSE_p)^{1/2},$$

$$MSE_p = \sum_{n=1}^N e_n^2 / N,$$

$$SA_p^2 = SD_p^2 - MSE_p, \quad (2), (3), (4)$$

117

118 Sep is the standard error of person measure

$$H_p = (4G_p + 1)/3,$$

$$R_p = \frac{SA_p^2}{SD_p^2} = 1 - \frac{MSE_p}{SD_p^2} = \frac{G_p^2}{(1+G_p^2)}, \quad (5), (6)$$

119

120 Rp is the person reliability; MSE is mean squared SE; SD is standard deviation; H is
121 the number of strata that can be separated based on the Gp

$$R_p = 1 - \frac{\sigma_p^2}{\sigma_x^2}, \quad (7)$$

122

123 Rp is the person reliability

$$R_p = 1 - \frac{\sigma_p^2}{\sigma_x^2} = 1 - \frac{MSE_p}{SD_p^2}, \quad (8)$$

124

125 Sigma x is person variance in measure; sigma p is the squared (mean SE).

$$\ln\left(\frac{p_{nij}}{p_{ni(j-1)}}\right) = \text{logit}(p_{nij}) = \theta_n - \delta_{ij},$$

$$p_{nij} = \frac{\exp(\text{logit}_{nij})}{1+\exp(\text{logit}_{nij})},$$

$$W_{ni} = \sum_{k=0}^M (k - E_{ni})^2 \times p_{nik},$$

$$E_{ni} = \sum_{k=0}^M k \times P_{nik},$$

$$Y_{ni} = X_{ni} - E_{ni},$$

$$Z_{ni} = \frac{Y_{ni}}{\sqrt{W_{ni}}},$$

$$Z_{ni}^2 = \frac{Y_{ni}^2}{W_{ni}}, \quad (9), (10), (11), (12), (13), (14), (15)$$

126

127 In Equations 9 to 15, the squared(Z-score) in Eq 15 can be obtained for each
128 person on a specific item. The Z-score is in Eq 14.

$$\text{Outfit MNSQ} = \frac{\sum_{i=1}^L Z_{ni}^2}{L}, \quad (16)$$

129

130 The person outfit MNSQ is in Eq 16, where L is the item length.

$$131 \quad \text{Infit MNSQ} = \frac{\sum_{i=1}^L Z_{ni}^2 \sigma_{ni}^{-2}}{\sum_{i=1}^L \sigma_{ni}^{-2}} = \frac{\sum_{i=1}^L (X_{ni} - E_{ni})^2}{\sum_{i=1}^L \sigma_{ni}^2}, \quad (17)$$

132 The person outfit MNSQ is in Eq 17. The summation of variance across items is
 133 denoted in the denominator.

134 How to compute the real RMSE and real person reliability refers to Standard
 135 errors: model and real at <https://www.winsteps.com/winman/standarderrors.htm>

136

137

138 2. How to conduct ANOVA with programming code

```

139          TSSb=0:  TSS=0
140          redim g_mean(max_group)  ' group number
141          redim Group_num(max_group)
142          allmean2=allmean2/personno ' allmean2=mean measrure
143          for jk=1 to  personno
144          g_mean(conabc2(jk))= g_mean(conabc2(jk))+ person(jk)
145          ' person(jk) is person measure and conabc2(jk) refers to group#. In this case, we
146          compute mean measure for each group
147
148          Group_num(conabc2(jk))=Group_num(conabc2(jk))+1 ' to gain the count for each
149          group
150          TSS=TSS+(person(jk)-allmean2)^2   'total sum square of deviations
151          from mean
152          next
153          for j=0 to  max_group
154          if Group_num(j)>0 then
155          g_mean(j)= g_mean(j)/Group_num(j)
156          else
157          g_mean(j)=0
158          end if
159          next
160          'To compute the mean in measure by group
161          for jm=0 to max_group
162          TSSb=TSSb+ Group_num(jm)* (allmean2-g_mean(jm))^2
163          ' between group in TSS
164          next

```

```

165      'ANOVA ====== to compute df=degree of freedom
166
167      dft=personno-1
168      dfb=max_group+1-1
169      dfw=dft-dfb
170      dfw=0
171      for j=0 to max_group
172          dfw= dfw+ Group_num(j)-1
173      next
174      TSSw=TSS-TSSb
175      if dfb>0 and dft-dfb>0 then
176          MSb=TSSb/dfb
177          MSw=TSSw/(dft-dfb)
178      else
179          MSb=0
180          MSw=0
181      end if
182      ' to compute F-test
183      if msw>0 then
184          Fstatistic=round(msb/msw,2)
185      else
186          Fstatistic=1
187      end if
188      p_F=="FDIST(" & Fstatistic & "," & dfb & "," & dfw & ")"
189      =====
190      ' to make ANOVA Table on the website
191      %>
192      </table>
193      <table style="width:100%"><tr><td><font
194      color=red>ANOVA</font></td><td>Virable</td><td>SS</td><td>df</td><td>MSS</t
195      d><td>F</td><td><font color=red>p</font></td></tr>
196      <tr><td>
197      </td><td>Between</td><td><%=round(TSSb,2)%></td><td><%=dfb%></td><td><%
198      round(MSb,2)%></td><td><%=round(Fstatistic,2)%></td><td><%=p_F%></td></tr>
199      <tr><td>
200      </td><td>Within</td><td><%=round(TSSw,2)%></td><td><%=dfw%></td><td><%
201      round(MSw,2)%></td><td></td><td><a
202      href="https://www.socscistatistics.com/pvalues/fdistribution.aspx"

```

```

203 target=blank><font color=red>p-value(Click on Me)</font></a></td></tr>
204 <tr><td>
205 </td><td>TSS</td><td><%=round(TSS,2)%></td><%=personno*itemno-
206 1%><td><%=dfw+dfb%> </td><td> </td><td><font color=red>All mean=
207 </font></td><td><%=round(allmean,2)%> </td></tr>
208 </table>
209 %>

```

210 3. How to estimate model parameters

211 More information refers to **Rasch demonstration software at**
 212 <https://www.rasch.org/software.htm>
 213 Mark Moulton (Windows) and John M. Linacre (Windows)

214 C. Dichotomous response(with missing)(3rd Week)

215 If Missing response exists, the dataset is displayed in **person 1 and item 1** as below(or
 216 in Excise of the demo in MSExcel):

Item1	item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10	name	group
.	1	1	1	1	1	1	1	0	1	Student1	1
1	1	1	1	1	1	1	0	1	0	Student2	1
1	1	1	1	1	1	0	1	0	0	Student3	1
1	1	1	1	1	1	0	1	0	0	Student4	0
1	1	1	1	1	1	0	1	0	0	Student5	0
1	1	1	1	1	0	1	0	0	0	Student6	1
1	1	1	1	0	1	0	0	0	0	Student7	0
1	0	1	0	1	0	0	0	0	0	Student8	1
0	1	0	1	0	0	0	0	0	0	Student9	0

217 Note. Using the dot to represent the missing response; data come from **Mark**
 218 **Moulton (Windows)**

responses(Person in rows and Variables in columns)								
Item1	item2	Item3	Item4	Item5	Item6	Item7	Item8	
Item9	Item10	name	group					
.	1	1	1	1	1	1	1	
0	1	Student1		1				
1	1	1	1	1	1	1	0	
1	0	Student2		1				
1	1	1	1	1	1	0	1	
0	0	Student3		1				
1	1	1	1	1	1	0	1	
0	0	Student4		0				
1	1	1	1	1	1	0	1	
0	0	Student5		0				
1	1	1	1	0	1	0	0	
0	0	Student6		1				
:	1	1	1	0	1	0	0	

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears.

Visual displays

KIDMAP person#

Bubble Size

219

220 Copy & paste data into the box

221

10=rows(including head labels)
 the number of persons=1 - 9



category_number=2, Max.=1, Min.=0 Cat. number Type(1=threshold)=4=RSM
 Ranking

Residuals=0.05 previous vs. after= 0.05 Steps...1 difficulty=0
 iteration...

13

Strata item= All items

Strata	Sum(n*k)	Mean	Expected	Variance
A_1	8	9	0.89	7.97
B_2	29	40	0.72	28.9
C_3	11	20	0.55	11
D_4	5	20	0.25	5.08
ChSQ=	3.58	df=	30	prob.= 1

Ref. in Eq 4([click](#))

Strata_raw score item=1

Strata	Sumn	Mean	Expected	Variance
B_2	4	4	1	3.98
C_3	2	2	1	1.89
D_4	1	2	0.5	1.1
ChSQ=	0.16	df=	3	prob.= 0.98

Ref. in Eq 4([click](#))

222

223

224 Ten row exist in this dataset with the maximum=1 and nine persons

225 The number of category is 2 with maximum=1 and minimum=0 under the rating scale

226 model(RSM)
 227 Model residual stops at 0.05. Due to the dichotomous responses, the step threshold
 228 is one and the mean difficulty as usual is set at zero.
 229 Iteration numbers=13
 230 Four strata are in existence. The model data fit is expressed by chSQ=3.58 with df=30
 231 and prob.=1.0, indicating the data fit the Rasch model fairly well.
 232 Notes that if the fit statistics with Infit MNSQ shown later in this manual, we can
 233 see that all items' Infit MNSQs are within the criteria between 0.5 and 1.5.

No.	Item	Difficulty	Model SE	Infit MNSQ	Outfit MNSQ	Raw Score
1		-2.94	1.29	0.56	0.17	7
2		-2.94	1.29	1.22	0.36	8
3		-2.94	1.29	0.56	0.17	8
4		-2.94	1.29	1.22	0.36	8
5		-1.45	1.17	1.44	0.6	7
6		-0.21	1.06	0.99	0.49	6
7		2.48	0.92	1.08	0.9	3
8		1.66	0.91	1.07	0.91	4
9		4.64	1.24	1.42	0.55	1
10		4.64	1.24	0.41	0.15	1

234
 235 The overall Chsq fit statistics of item# 1 is 0.16, df=3(=the number of strata minus
 236 1), and prob.=0.98, indicating the item has a perfect fit to the Rasch model.
 237

N	Perso	Grad	Thet	Model S	Infit MNS	Outfit MNS	Chi_2	Raw Sco
o.	n	e	a	E	Q	Q	q	re
1	1	A03	4.85	1.27	0.83	0.22	1	8
2	1	B01	3.4	1.17	2	0.98	1	8
3	1	B04	2.06	1.15	0.45	0.17	1	7
4	0	B04	2.06	1.15	0.45	0.17	1	7
5	0	B04	2.06	1.15	0.45	0.17	1	7
6	1	C02	0.74	1.14	1.74	0.88	1	6
7	0	C04	-0.4	1.05	0.98	0.45	1	5
				8				
8	1	D03	-2.3	0.9	1.28	0.73	1	3
				2				
9	0	D04	-3.1	0.92	0.87	0.43	1	2

238
 239 Nine person measures and raw scores are shown above.
 240 A03 means the ability with measures at the top, followed by B, C, and D grades.
 241 That is, four strata from A to D are divided in this dataset.
 242

ANOVA	Virable	SS	df	MSS	F	89	p
	Between	5.83	1	5.83	0.84		=FDIST(0.84,1,7)
	Within	48.45	7	6.92			p-value(Click on Me)
	TSS	54.28	8		All mean=	0.59	
							

- 243
244 ANOVA for groups shows that $p=0.39$ as shown below using the arrow link to find the
245 p-value after entering the values below:

If you need to derive an F ratio value from raw data, [you can find an ANOV](#).

F -ratio value:	0.84
DF - numerator:	1
DF - denominator:	7

Significance Level:

- .01
- .05
- .10

The p -value is .38988. The result is *not* significant at $p < .05$.

- 246 [Calculate](#)
- | person | Outfit | GroupCount | Total | Mean | Varinace | Tlogit | Logt | Var | 6 | 7 | 8 | 9 | 10 |
|--------|--------|------------|-------|------|----------|--------|------|-----|---|---|---|---|----|
| A1 | 0.22 | | | | | | | | | | | | |
| A2 | 0.98 | | | | | | | | | | | | |
| A3 | 0.17 | | | | | | | | | | | | |
| A4 | 0.17 | | | | | | | | | | | | |
| A5 | 0.17 | | | | | | | | | | | | |
| A6 | 0.88 | | | | | | | | | | | | |
| A7 | 0.45 | | | | | | | | | | | | |
| A8 | 0.73 | | | | | | | | | | | | |
| A9 | 0.43 | | | | | | | | | | | | |
| - | - | | | | | | | | | | | | |

- 247 Two unexpected responses exist in this test
248 Other similar information as the dichotomous data(without
249 missing responses) that can be interpreted by readers
250 themselves, such as

N	Ite	Difficult	Model	S	InfitMNS	OutfitMNS	Raw	Scor
o.	m	y	E	Q	Q	e		
1		-2.94	1.29	0.56	0.17		7	
2		-2.94	1.29	1.22	0.36		8	
3		-2.94	1.29	0.56	0.17		8	
4		-2.94	1.29	1.22	0.36		8	
5		-1.45	1.17	1.44	0.6		7	
6		-0.21	1.06	0.99	0.49		6	
7		2.48	0.92	1.08	0.9		3	
8		1.66	0.91	1.07	0.91		4	
9		4.64	1.24	1.42	0.55		1	
252	10	4.64	1.24	0.41	0.15		1	

253 Item features

=====					
Person	RAW_SCOUNTMEAS.	SE	Infit	Outfit	
MEAN	5.9	10	1.03	1.01	0.47
S.D.	2.02	0	2.45	0.11	0.53
MAX.	8	10	4.85	1.27	2
MIN.	2	10	-3.13	0.9	0.45
REAL RMSE	1.23	ADJ.SD 2.12	SEPARATION 1.73	Person RELIAB.0.75	
MODEL RMSE	1.08	ADJ.SD 2.19	SEPARATION 1.98	Person RELIAB.0.8	
Cronbach's alpha=0.84	Step delta=0				
=====					
Item	RAW_SCOUNTMEAS.SE		Infit	Outfit	
MEAN	5.3	9	0	1.17	1
S.D.	2.69	0	2.98	0.15	0.34
MAX.	8	9	4.64	1.29	1.44
MIN.	1	9	-2.94	0.91	0.41
REAL RMSE	1.27	ADJ.SD 2.69	SEPARATION 2.12	Item RELIAB.0.82 啟用 Windows	
MODEL RMSE	1.08	ADJ.SD 2.73	SEPERATION 2.32	Item RELIAB.0.84 移至 [設定] 以啟用 Window	
=====					

254

255 Summary Table

HomePage
Goals
Read Me First
Introduction & Data
MP4 Video
Rasch Analysis
Outfit/Infit MNSQ
Summary Table
ANOVA
Wright Map
Wright Map(Groups)
KIDMAP
ICC_cat

256

257 D.Visual displays in dichotomous response(with

258

missing)(4th week)

responses(Person in rows and Variables in columns)								
Item1	item2	Item3	Item4	Item5	Item6	Item7	Item8	
Item9	Item10	name	group					
.	1	1	1	1	1	1	1	
0	1	Student1		1				
1	1	1	1	1	1	1	0	
1	0	Student2		1				
1	1	1	1	1	1	0	1	
0	0	Student3		1				
1	1	1	1	1	1	0	1	
0	0	Student4		0				
1	1	1	1	1	1	0	1	
0	0	Student5		0				
1	1	1	1	1	0	1	0	
0	0	Student6		1				
:	1	1	1	0	1	0	0	

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears.

Visual displays

KIDMAP person#

Bubble Size

WrightMap dotted with dashes

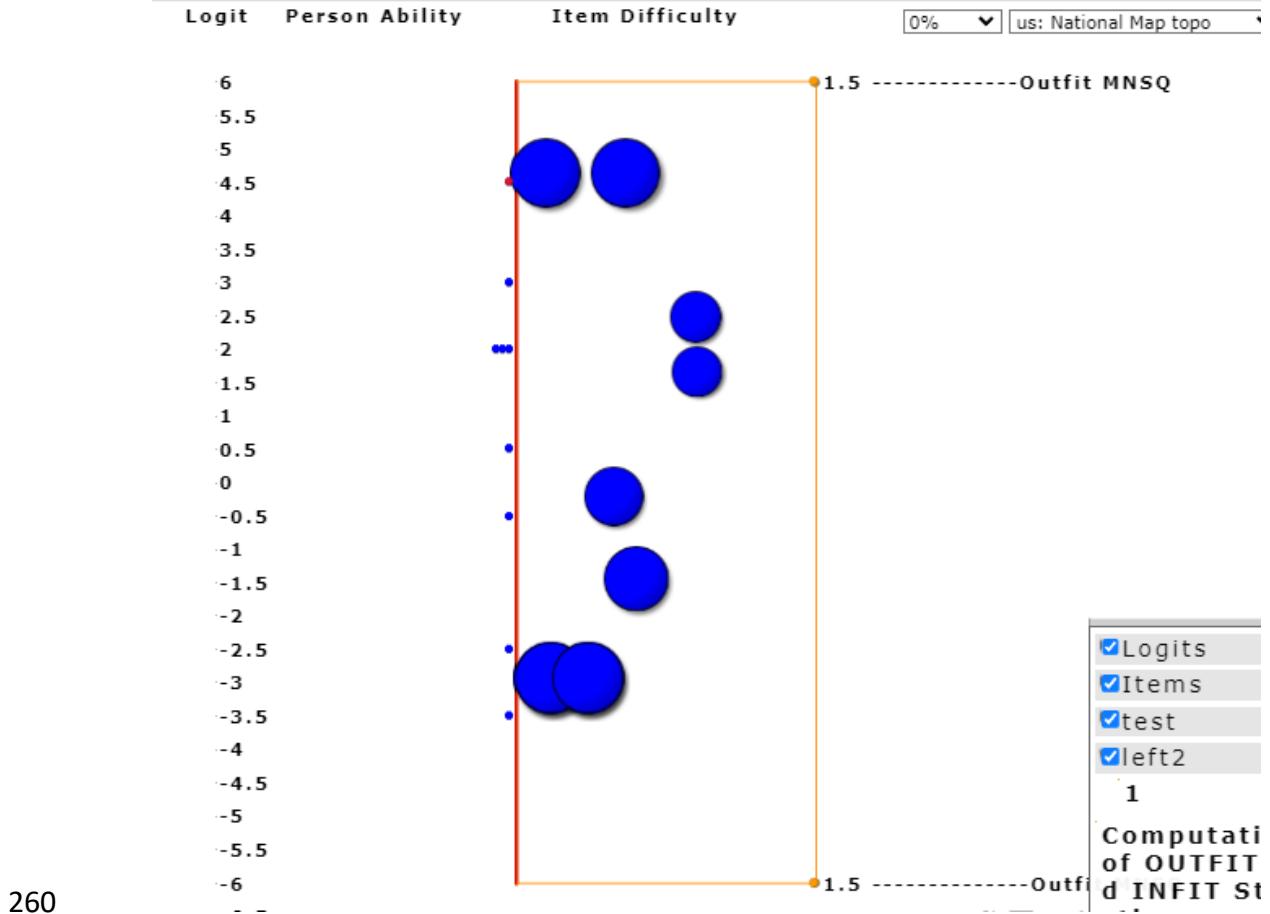
Fit Types

adjustwright Wright move to left

ICC Item#

Group#

259



261 Wright Map

262

Visual displays

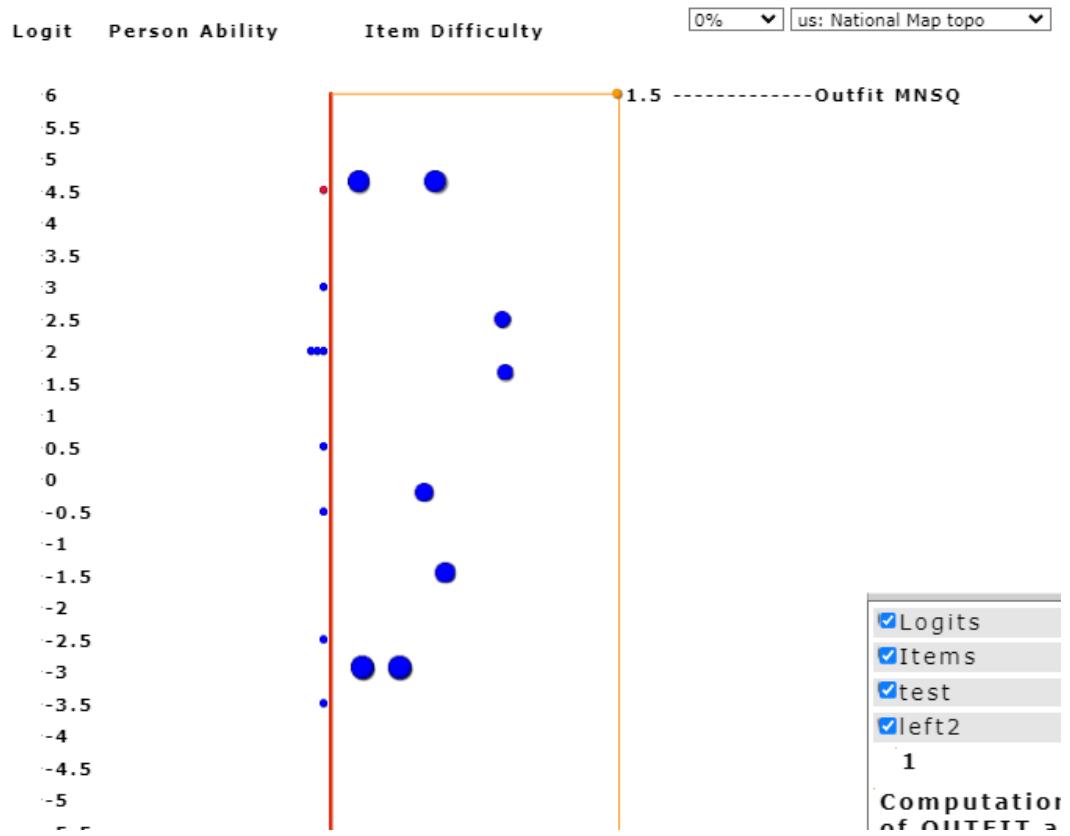
KIDMAP person#

Bubble Size

263

To adjust bubble size to 1

264

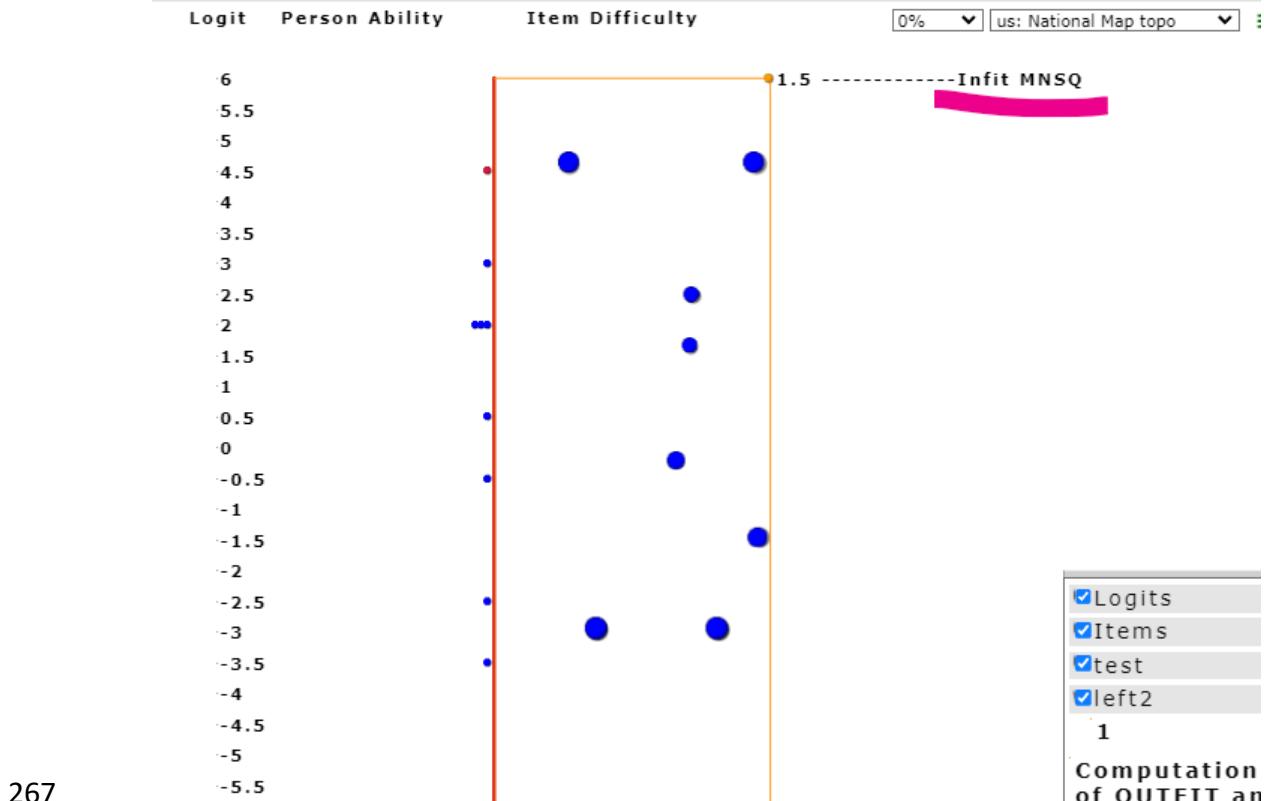


265

Visual displays Wright Map
KIDMAP person# 1
Bubble Size 1
Submit
WrightMap dotted with dashes No
Fit Types Infit MNSQ
adjustwright Wright move to left 0

266

To adjust the fit statistics with infit

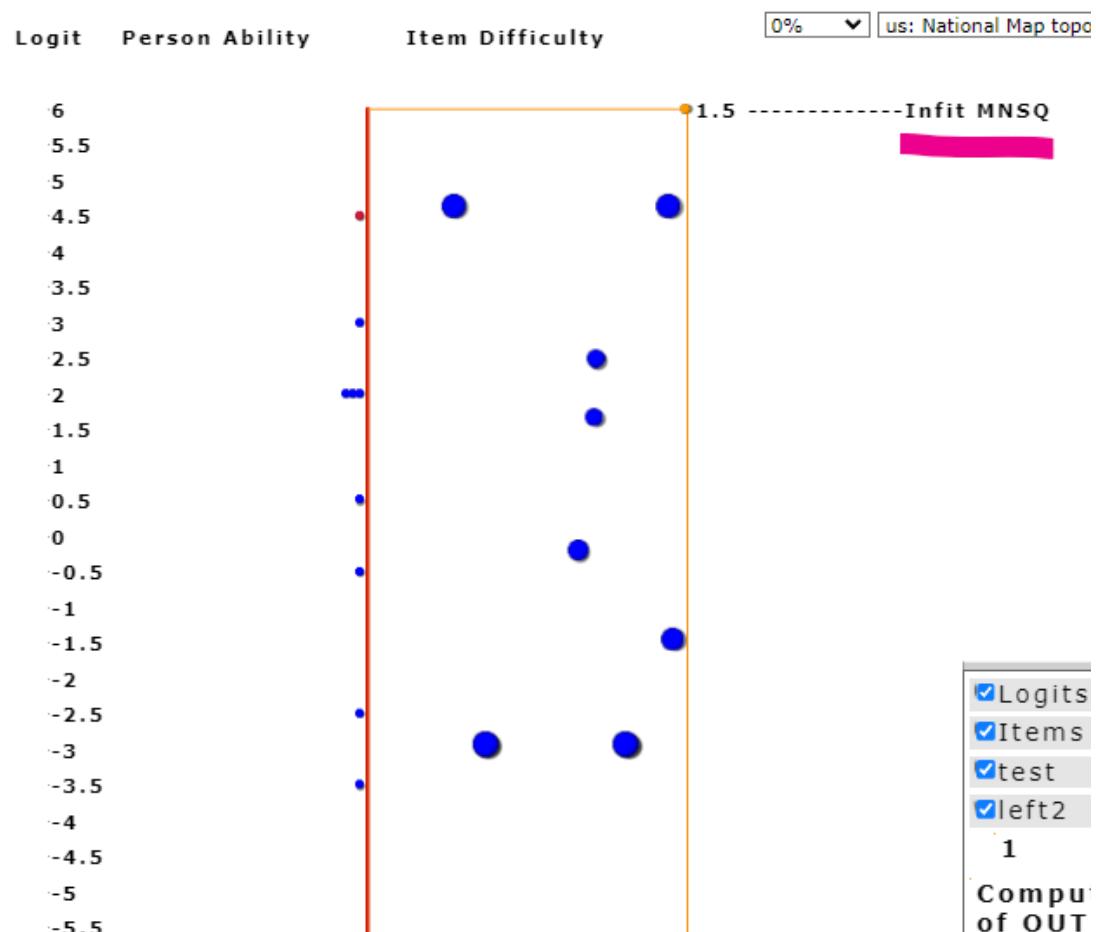


268 Item infit MNSQs are displayed, different from
269 those with Outfit MNSQ in the previous
270 example.

271

272 If dash is selected, the results are identical due
273 to no step difficulties in the dichotomous scale
274 as shown below:

275



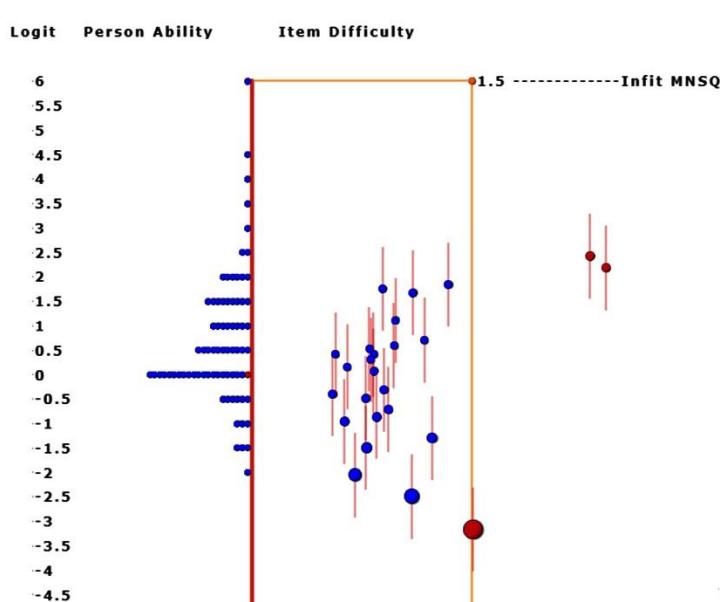
276

Otherwise, dashes are shown for RSM; see

277

below.

278



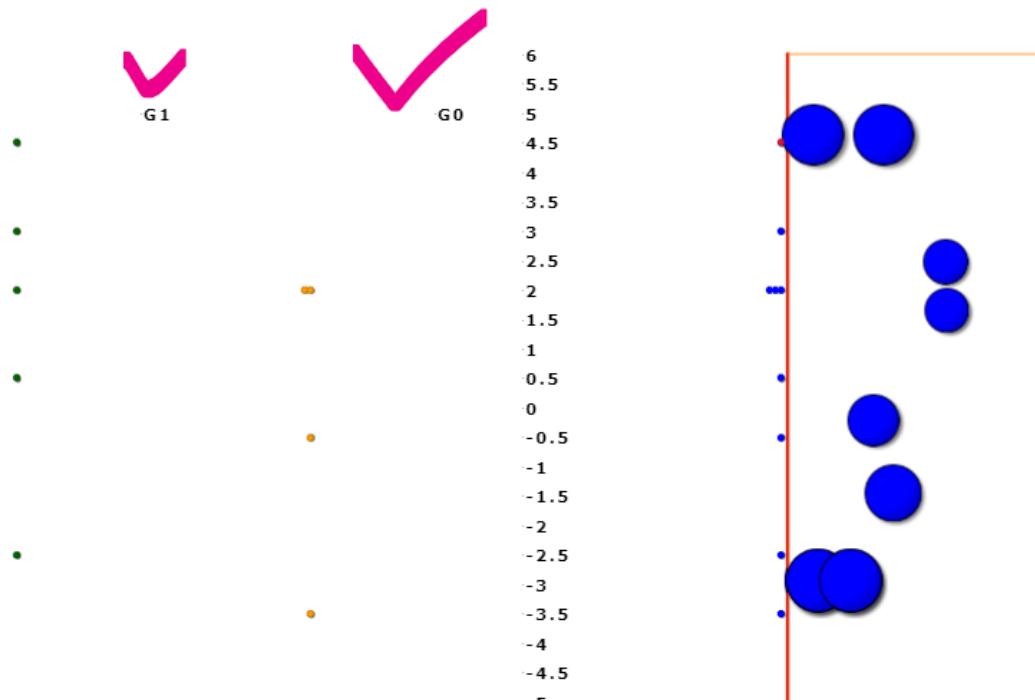
279

280

Visual displays Wright Map(Groups) ↗
KIDMAP person# 1
Bubble Size 3
Submit
WrightMap dotted with dashes Yes
Fit Types Outfit MNSQ
adjustwright Wright move to left 0

281

Wright Map with groups selected



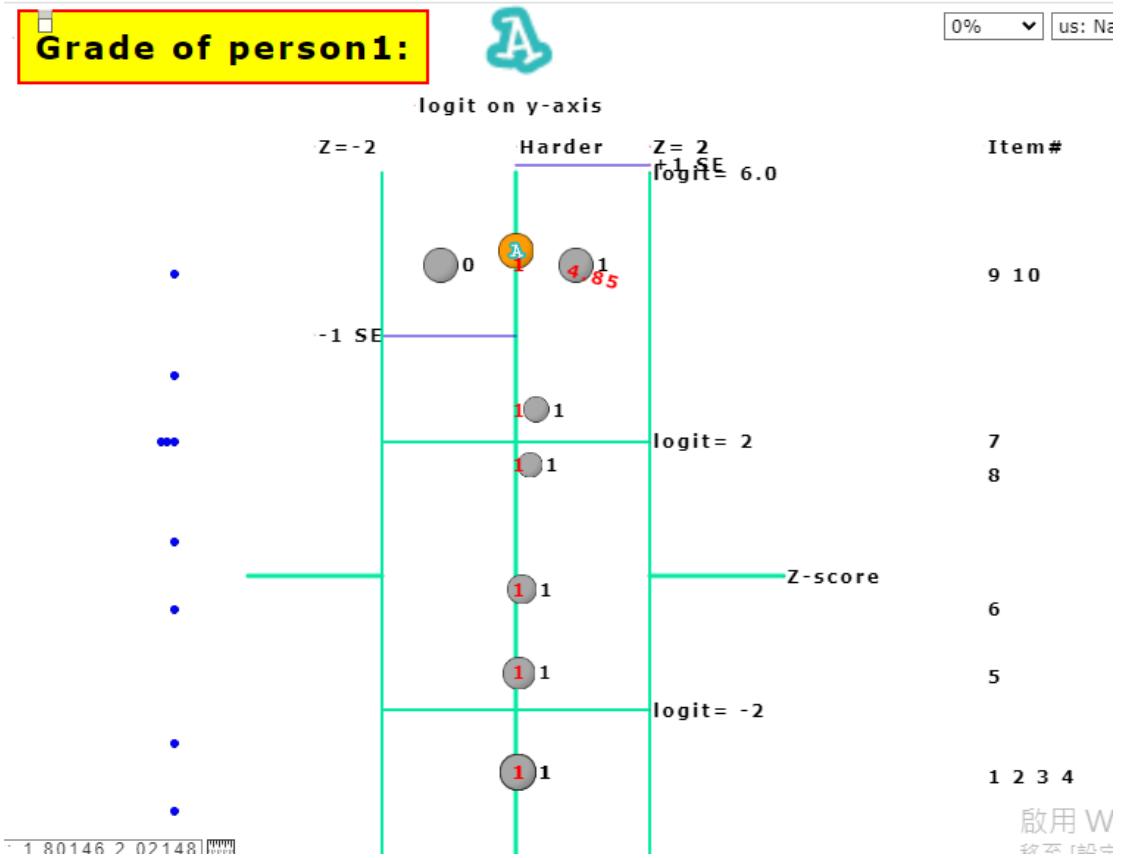
283

284 More distributions in groups are displayed on the left-hand side.
285 Note. the summation of numbers in groups are identical to the total
286 counts on the right-hand side.

Visual displays KIDMAP ↗
KIDMAP person# 1
Bubble Size 3
Submit
Fit Types Outfit MNSQ
adjustwright Wright move to left 0

287

288 Kidmap by adjustments of bubble size and person number(e.g., 1 in
289 this case).



290
291 The person 1 has the Theta(4.85) at the top with yellow bubble and
292 one SE above and beneath the red bubble.

293 Other item bubbles within the person +/-SE mean 50% probability to
294 answer correct to the items.

295 In this case, no such easy items with unexpected occurrences(i.e.,
296 incorrect in the easy items) observed; see the left-bottom sides based
297 on the view of the yellow bubble.
298

Visual displays KIDMAP

KIDMAP person# 5

Bubble Size 2

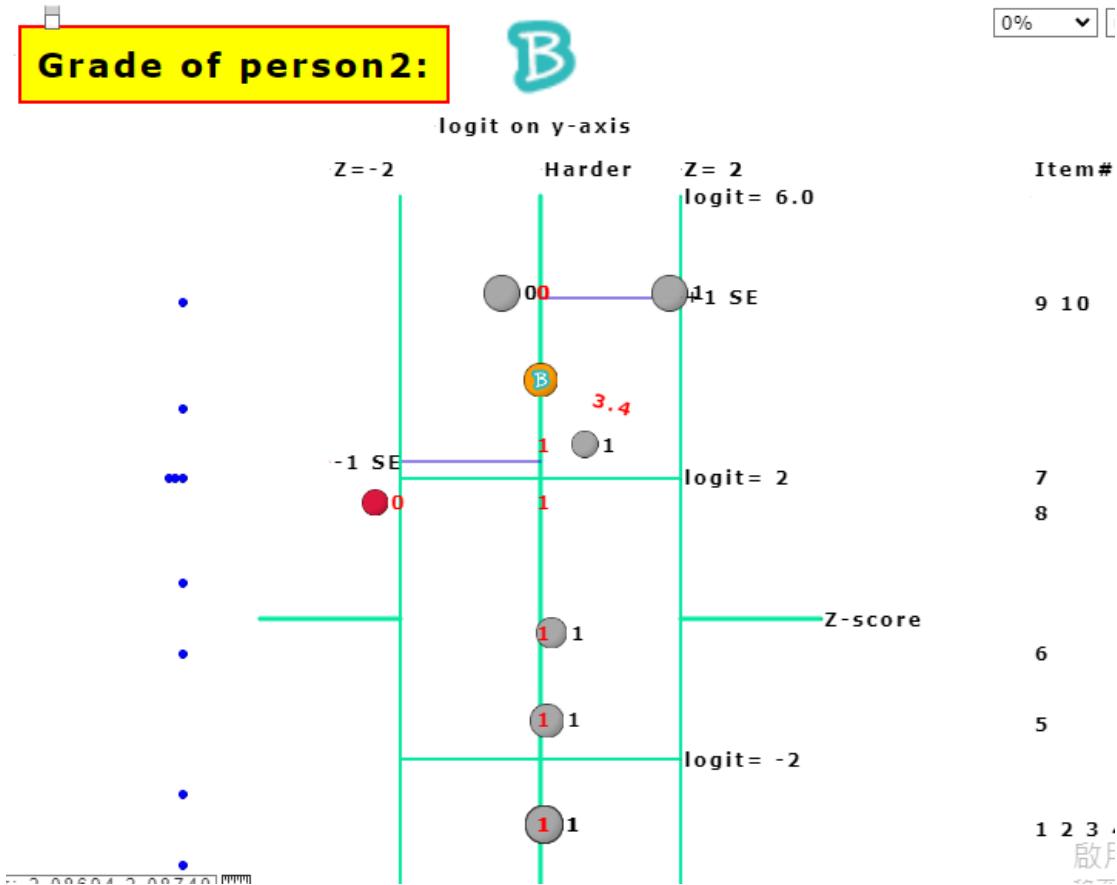
Submit

299
300 In this case for person 5 and bubble size adjusted to 2, no such easier
301 or harder unexpected items are observed below. That is, no items
302 locate in the right-top and left-bottom panels, indicating harder items

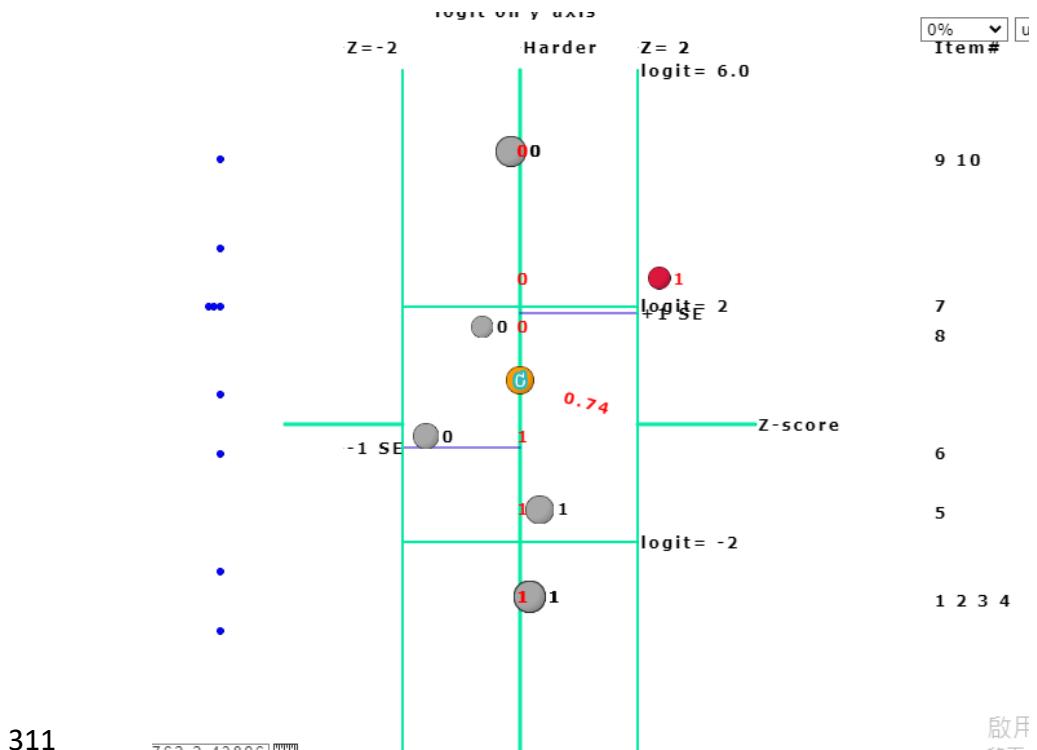
303 with correct answers and easier items with incorrect answers,
304 respectively.

person	Group	Count	Total	Mean	Var	inceT	logit	Logt	Var
A1	Outfit	1	2	3	4	5	6	7	8
A2		0.22							
A3		0.98							
A4		0.17							
A5		0.17							
A6		0.17							
A7		0.88							
A8		0.45							
A9		0.73							
		0.43							

305 **Z-score**
306 Next, we select persons 2 and 6 with unexpected responses.

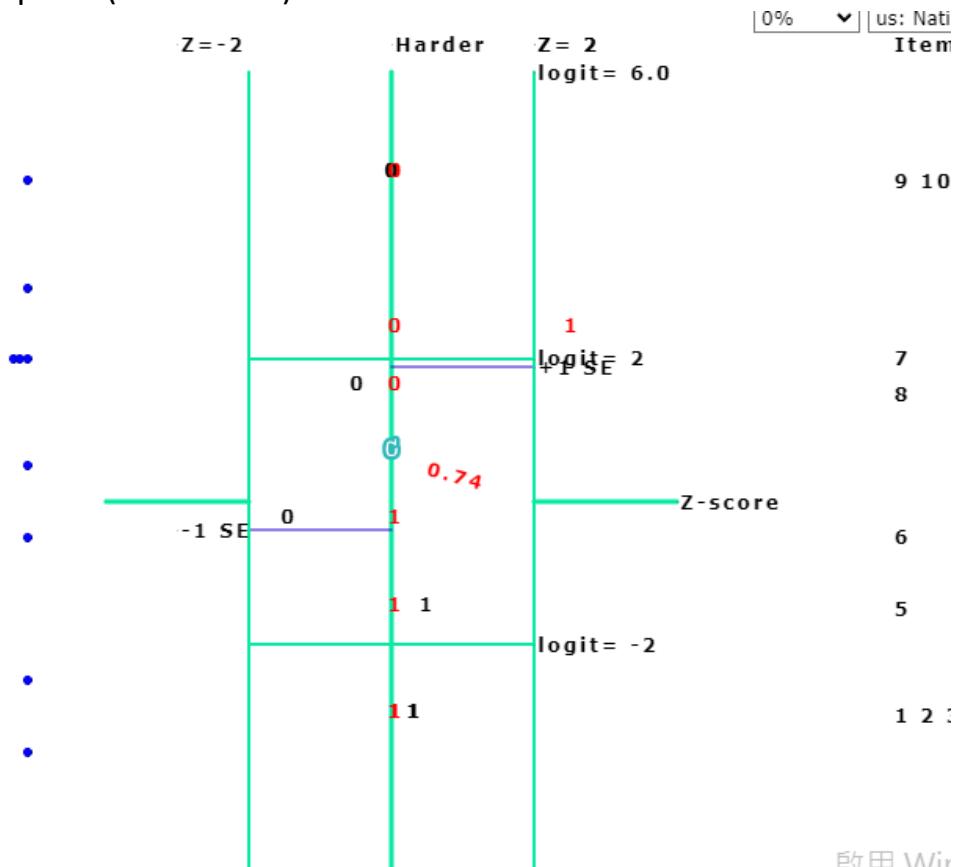


307
308 For person 2, we can see that item 8 in red bubble is
309 unexpected(Zscore <-2.0) due to the easy item with incorrectness at
310 the left-bottom side.



311

312 For person 6, we can see that item 7 in red is harder but correct in the
313 right-top side($Zscore > 2.0$)



314

315

316 If bubbles were selected with smaller size, the
317 KIDMAP can be clear with expected and
318 observed responses across items along with
319 difficulties from top to bottom.

320

Visual displays —

KIDMAP person#

Bubble Size

Submit

Fit Types

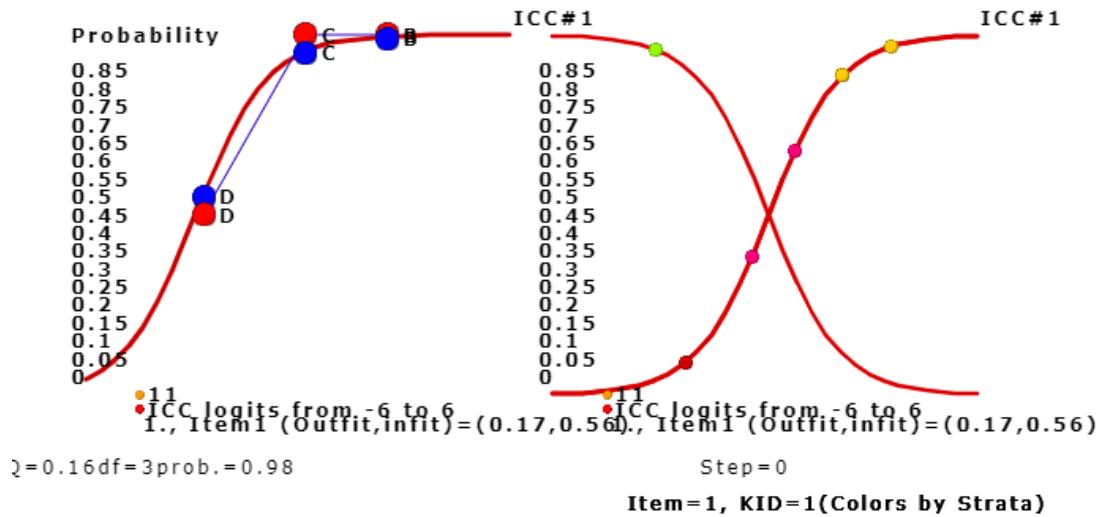
adjustwright Wright move to left

ICC Item# —

Group#

321

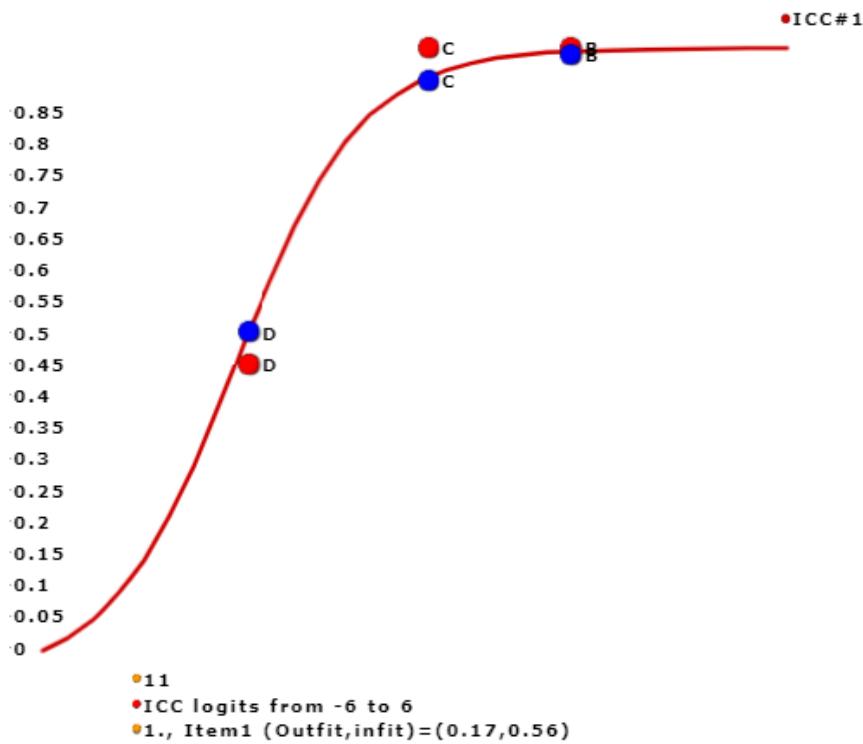
322 The CATEGORY PROBABILITIES: MODES - Andrich thresholds at
323 intersections with ICC shows item# 1 for all persons below:



324

325 We can see that only person 9 answers the item 1 with
 326 incorrectness. Other persons answer the item 1 with
 327 correctness on the success ogive curve for left-bottom to right-
 328 top corner. Persons with higher ability are on the right-hand
 329 side. The bubble denoted by the vertical probability is
 330 corresponding to the person ability.

331 Moving to the left on Google Maps, the ICC of item 1 shows
 332 above or below. The red bubbles denote the observed
 333 responses by persons and the blue ones represent the expected
 334 responses by persons. The ChSQ statistics shown below, similar
 335 to the overall fit selected in the menu at the beginning.



•Bubble: red=observed, blue=expected; Fit statistics=ChSq=0.16 df=3 prob.=0.98

336

Visual displays []

KIDMAP person#

Bubble Size

WrightMap(or ICC) dotted with dashes []

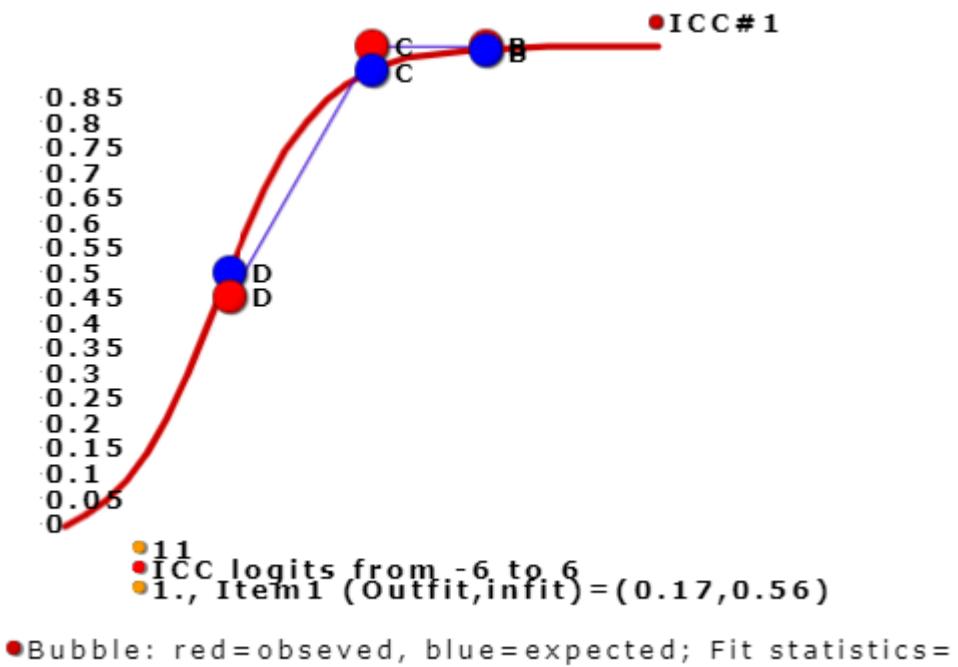
Fit Types []

ICC Item#

Group# []

337

338 To add lines linked observed bubbles in ICC



339

Visual displays

KIDMAP person#

Bubble Size

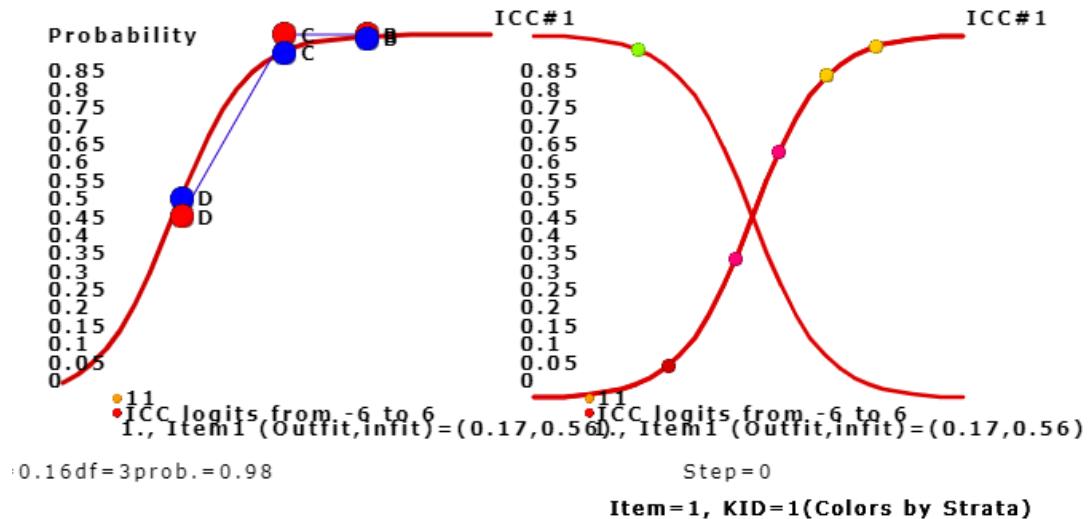
Fit Types

adjustwright Wright move to left

ICC Item#

340

341 If item 2 is selected, the ICC is shown below:



342

343 Bubbles are colored by groups

344 Person 8 answers item 2 incorrect at the left-top corner.

345 Others answer item2 correct on the success curve. The green

346 bubble represents the one we select person 2 in the

347 confirmation step.

348

349 The ICC of item 2 shows that the prob.=-.98 for the data

350 fitting to Rasch model. Readers are invited to link all those

351 observed cases in comparison to those expected ones on the

352 ICC.

N	Pers	Gra	The	Model	InfitM	OutfitM	Chi	Raw	Sc
o.	on	de	ta	SE	NSQ	NSQ	_q	ore	
1	1	A03	4.85	1.27	0.83	0.22	1	8	
2	1	B01	3.4	1.17	2	0.98	1	8	
3	1	B04	2.06	1.15	0.45	0.17	1	7	
4	0	B04	2.06	1.15	0.45	0.17	1	7	
5	0	B04	2.06	1.15	0.45	0.17	1	7	
6	1	C02	0.74	1.14	1.74	0.88	1	6	
7	0	C04	-0.4	1.05	0.98	0.45	1	5	
				8					
8	1	D03	-2.3	0.9	1.28	0.73	1	3	
				2					
353	0	0	D04	2.10	0.03	0.97	0.42	1	2

354 Why the ICC has six persons, but nine person in the dataset,
 355 which is the reason for the three persons have identical
 356 measures and make the bubble overlaid together.

357

358

Visual displays Person Fit Plot(Outfit) ↘

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ ↘

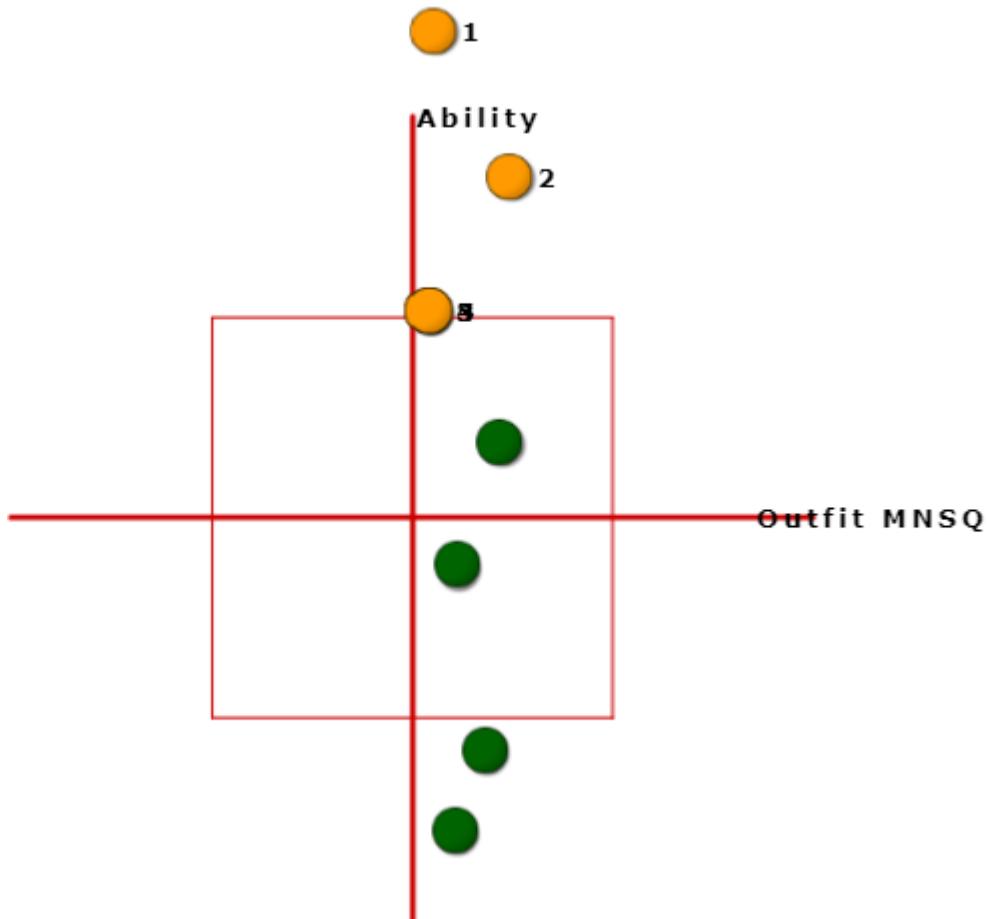
adjustwright Wright move to left 0

ICC Item# 1

Group# 1 ↘

359

360 Select person fit plot with outfit MNSQ,



361

362 Outfit MNSQs are on the x-axis and person abilities are on
363 the vertical y-axis. Bubbles are sized by person SE. In this case,

364 we observed that all persons have outfit less than 2.0.

Visual displays Person Fit Plot(Outfit) ▾

KIDMAP person#

Bubble Size

Submit

Fit Types Infit MNSQ ▾

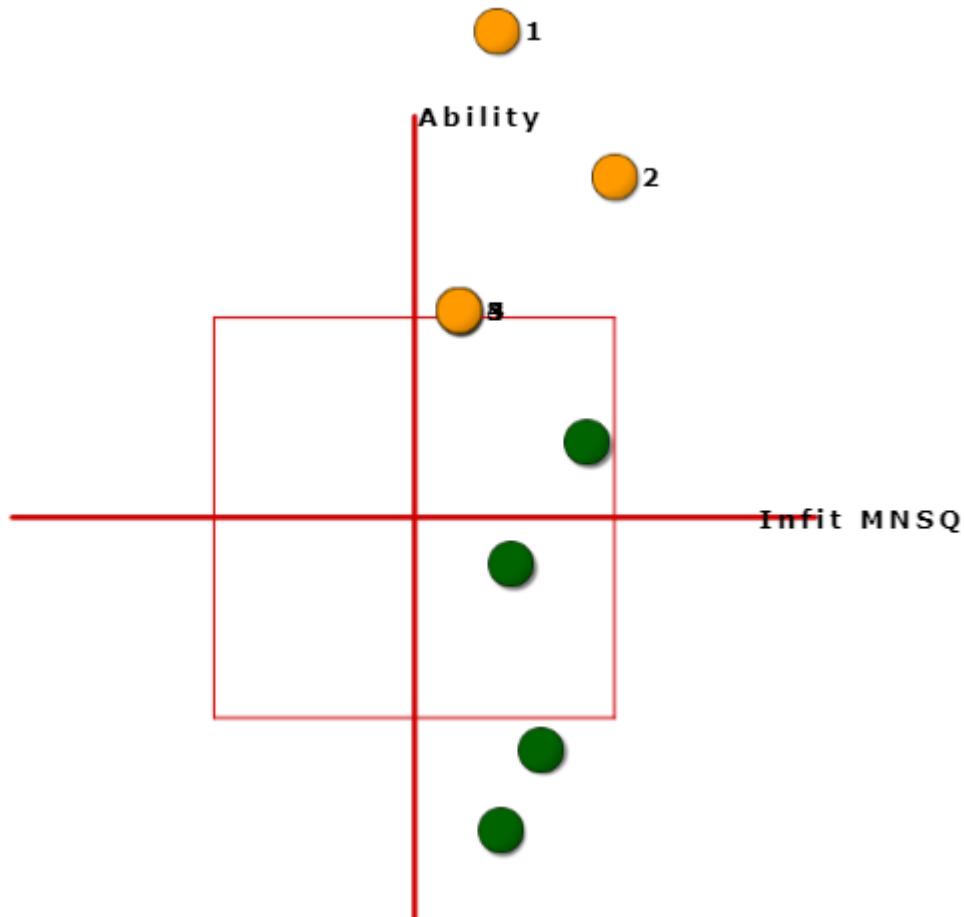
adjustwright Wright move to left

ICC Item#

Group# ▾

365

366 If Infit MNSQ is select, the person fit plot is shown below:



367

368 Bubbles are sized by person SE and shown with infit MNSQ.

Visual displays 

KIDMAP person#

Bubble Size

Fit Types

ICC Item#

Group#

369

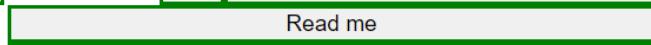
370 Measure Outfit is selected.

	rs p.18)			
CATEGORY	Rasch-Andrich threshold			
	1.=0			
Obs.1	4.85	0.22	148.54	0.22
Obs.2	3.4	0.98	134.02	0.98
Obs.3	2.06	0.17	120.56	0.17
Obs.4	2.06	0.17	120.56	0.17
Obs.5	2.06	0.17	120.56	0.17
Obs.6	0.74	0.88	107.39	0.88
Obs.7	-0.48	0.45	95.19	0.45
Obs.8	-2.32	0.73	76.8	0.73
Obs.9	-3.13	0.43	68.72	0.43

Name, citation, publication, and x-index, for example, with blanks from MS Excel using copy and pasted methods and bubble size is the person measures

X-axis: Y-axis: Move forward on X: Move forward on Y: Bubble:

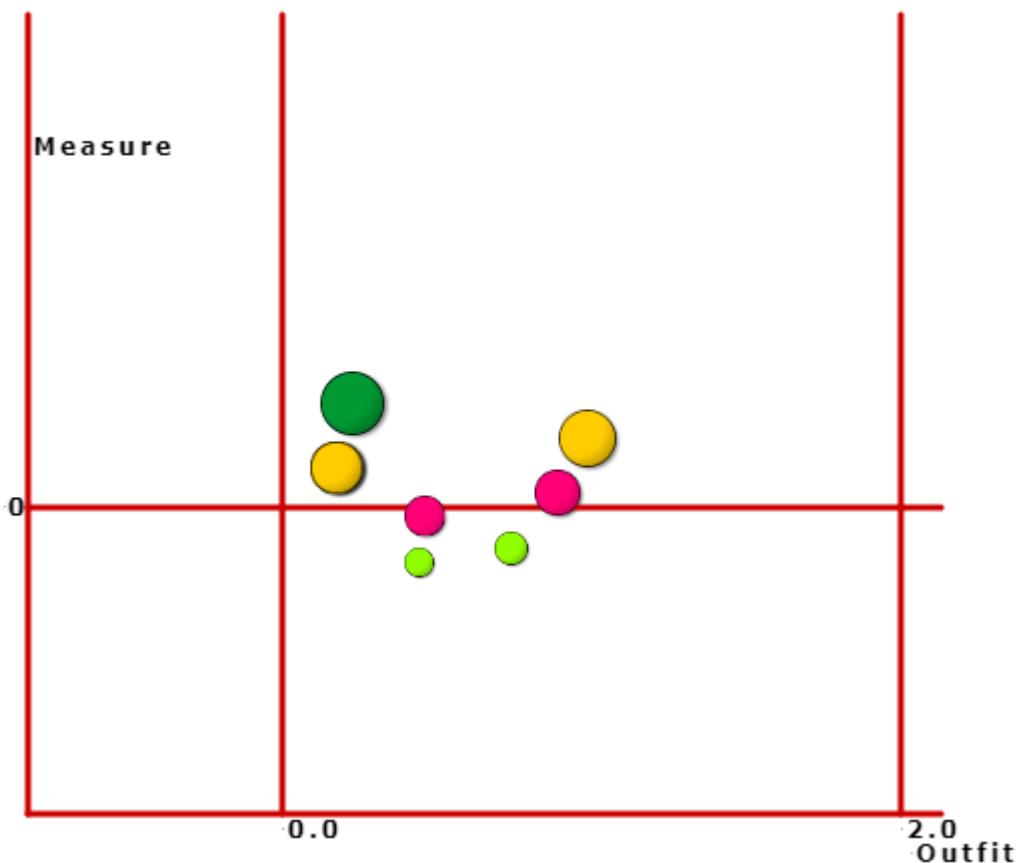
Wider on X: Wider on Y: 



371

372 The buffered form form is generated. After confirming it, the

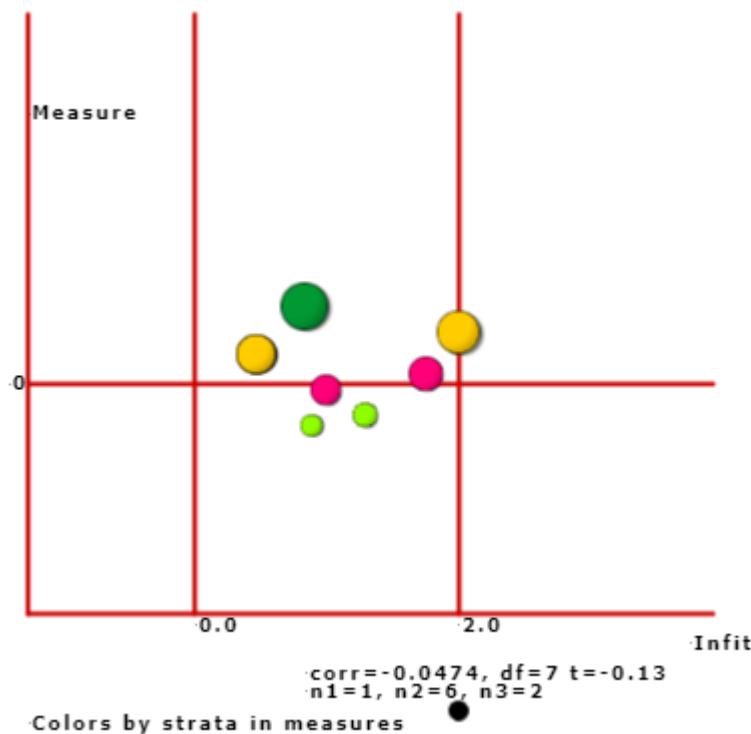
373 plot is show as below:



374

375

- 376 As the scatter plot showing the relationship between Outfit
377 MNMS and person measure, three parts with colors are shown
378 based on person strata.



379

380 Similarly, once the Infit MNSQ is selected, the measure-Infit
381 plot is shown above. The method is selected with Infit MMSQ
382 below.

Visual displays Measure_Infit

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ

ICC Item# 1

Group# 1

383

384

385

386 E. Visual displays in dichotomous response(with
387 missing)(5th week)

Visual displays Measure Rawscore

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ

ICC Item# 1

Group# 1

388

- 389 When Rawscore/measure plot is selected using Kano diagram,
 390 the confirmation is shown below:

Name, citation, publication, and x-index, for example, with blanks from MS Excel using and pasted methods and bubble size is the person measures

X-axis: 35 Y-axis: 16 Move forward on X: 0 Move forward on Y: 0 Bubble
 Wider on X: 1 Wider on Y: 1 **Submit**

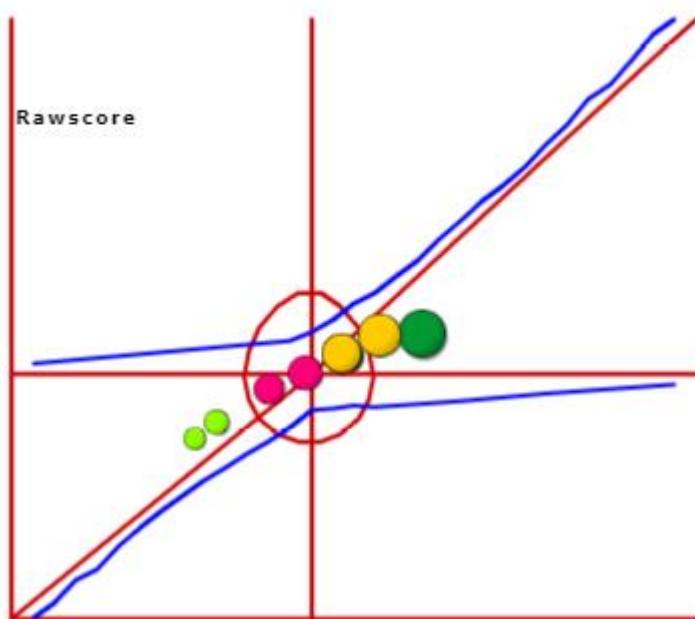
Read me

Forest plot

27.1694527	-200	-68.02897986	-200
27.67208952	-190	-67.5292349	-190
27.17477025	100	67.02018002	100

391

- 392 Confirm it and show the Kano diagram below:



393

- 394 We can see that all person measures are along with raw scores

395 on the one-dimensional part in the diagram.

396 The correlation coefficient is 0.9758 shown below the plot.

Visual displays Simulation

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

397

398 The simulation data can be generated based on the reference at

399 <https://www.rasch.org/rmt/rmt213a.htm>

Simulation data generated
Item1,item2,Item3,Item4,Item5,Item6,Item7,Item8,Item9,Item10,name,group
1,1,1,1,1,1,1,1,0,0,Student1,1
1,1,1,1,1,0,1,1,0,1,Student2,1
1,1,1,1,1,1,1,1,0,0,Student3,1
1,1,1,1,1,1,1,1,1,0,0,Student4,0
1,1,1,1,1,1,1,1,0,0,0,Student5,0
1,1,1,1,1,1,1,1,0,0,0,Student6,1
1,1,1,1,1,1,0,0,0,0,0,Student7,0
1,1,0,1,0,0,0,0,0,0,0,Student8,1
1,0,0,0,0,0,0,0,0,0,0,Student9,0

400

401 The result below the website is the simulation data. We copy

402 those data onto RaschOnline.

```
responses(Person in rows and Variables in columns)
```

```
Item1,Item2,Item3,Item4,Item5,Item6,Item7,Item8,Item9,Item10,n  
ame,group  
1,1,1,1,1,1,1,1,0,0,Student1,1  
1,1,1,1,1,0,1,1,0,1,Student2,1  
1,1,1,1,1,1,1,0,0,0,Student3,1  
1,1,1,1,1,1,1,1,0,0,Student4,0  
1,1,1,1,1,1,1,0,0,0,Student5,0  
1,1,1,1,1,1,1,0,0,0,Student6,1  
1,1,1,1,1,0,0,0,0,0,Student7,0  
1,1,0,1,0,0,0,0,0,0,Student8,1  
1,0,0,0,0,0,0,0,0,0,Student9,0
```



Copy data and Paste them onto the box from Spread sheet
Click on the submit bottom, the Result immediately appears.

Visual displays Simulation

KIDMAP person# 1

Bubble Size 3

Submit

403

- 404 Like this one above. If the visual display with None is selected,
405 the results show all items fit to Rasch model when observing all
406 infit/outfit MNSQ smaller than those in the original dataset.

N o.	Ite m	Difficu lty	Model SE	InfitMN SQ	OutfitMN SQ	Raw Score
1		-9.32	3.88	0.07	0.01	9
2		-4.06	1.76	0.2	0.05	8
3		-1.53	1.36	0.25	0.1	7
4		-4.06	1.76	0.2	0.05	8
5		-1.53	1.36	0.25	0.1	7
6		1.14	0.99	1.31	1.77	5
7		1.14	0.99	0.4	0.23	5
8		2.86	0.9	0.41	0.28	3
9		10	10.18	0	0	0
10		4.72	1.11	0.84	0.38	1

407

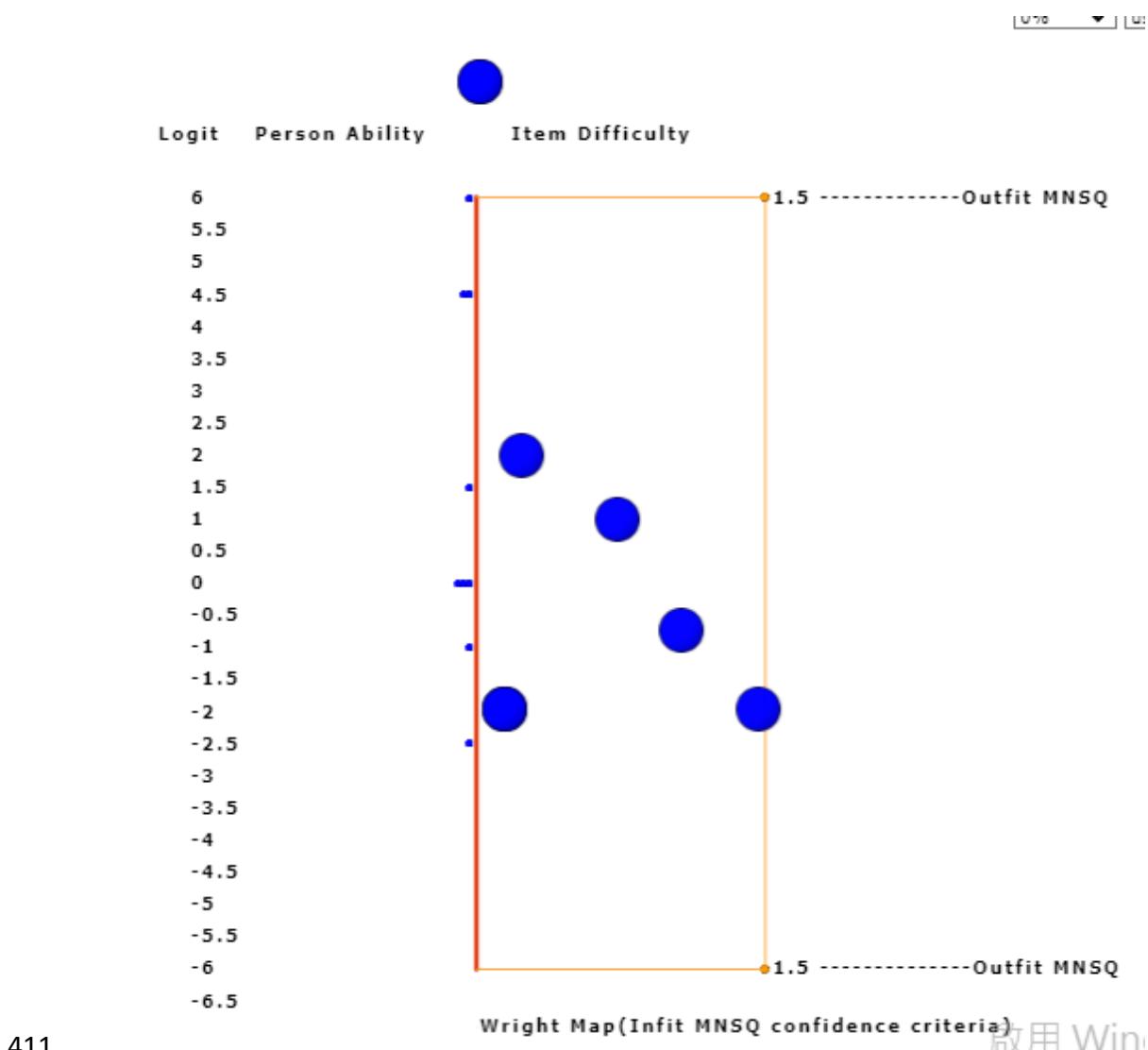
408 See how well items fitting to the Rasch model

N	Pers	Gra	The	Model	InfitM	OutfitM	Chi	Raw
o.	on	de	ta	SE	NSQ	NSQ	_q	ore
1	1	A05	3.85	1.35	0.32	0.1	1	8
2	1	A05	3.85	1.35	2.61	1.65	1	8
3	1	B03	2.25	1.16	0.36	0.14	1	7
4	0	A05	3.85	1.35	0.32	0.1	1	8
5	0	C01	0.99	1.1	0.65	0.24	1	6
6	1	B03	2.25	1.16	0.36	0.14	1	7
7	0	C03	-0.21	1.11	0.25	0.13	1	5
			3					
8	1	D03	-2.61	1.11	0.31	0.14	1	3
			4					
9	0	F01	-6.31	1.85	0.1	0.04	1	1
			9					

409

-

410 That is because the data fit Rasch model fairly well.



411

- 412 However, the two with extreme measures have larger
 413 standard errors in measures using Wright Map to display.
 414 When the bubble of interest is clicked, the detailed
 415 information about the item appears on Google Maps.

Visual displays DIF(2 groups) ▾

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ ▾

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

416

417 DIF(Table) has been selected(note. only for two group, 0 and 1

418 in group definition in RaschOnline).

KID	Obs-Ex	DIF	Step1			U			U			4		
			DIF	KID	Obs-Ex	DIF	DIF	DIF	DIF	DIF	DIF	JOIN	Rasch	Welc
CLAS	Averag	MEASUR	S.E.	CLAS	Averag	MEASUR	S.E.	CONTRAS	S.E.	t	-	h		sig.
S e	0	-10.19	11.2	1	0.01	-2.45	2.63	-7.74	11.55	0.67	0.55			
		5												
0	0.01	-1.18	3.4	1	0	-9.8	6.52	8.62	7.35	1.17	0.326			
0	0	-10.17	11.1	1	0.01	-2.45	2.63	-7.72	11.46	0.67	0.55			
		5												
0	0.01	-1.18	3.4	1	0	-9.8	6.52	8.62	7.35	1.17	0.326			
0	0	-10.17	11.1	1	0.01	1.24	1.49	-11.41	11.25	1.01	0.386			
		5												
0	0.01	2.82	1.48	1	0.01	-2.45	2.63	5.28	3.02	1.75	0.178			
0	0.01	2.82	1.48	1	0	4.48	1.28	-1.66	1.96	0.85	0.458			
0	0.01	2.82	1.48	1	0.01	3.03	1.2	-0.2	1.91	0.11	0.92			
0	0	17.39	20.0	1	0	4.48	1.28	12.9	20.06	0.64	0.568			
		2												
0	0	7.05	3.84	1	0	13.74	47.0	-6.69	47.17	0.14	0.898			
		1												

419

420 DIF Tables are shown accordingly.

421 How to interpret DIF Tables refers to [Differential item functioning](#)

422 [DIF pairwise at https://winsteps.com/winman/table30_1.htm](https://winsteps.com/winman/table30_1.htm)

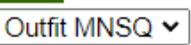
Copy data and Paste them onto the box from Spread sheet
Click on the submit bottom, the Result immediately appear

Visual displays DIF(Graph) 

KIDMAP person# 

Bubble Size 

Submit

Fit Types Outfit MNSQ 

adjustwright Wright move to left 

ICC Item# 

Group# 

423

424 If DIF graph is selected, the graph using forest plot appears

425 immediately on Google Maps after confirming the results

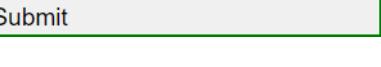
426 below.

Step1 0 0 4
responses(rows for each entity)

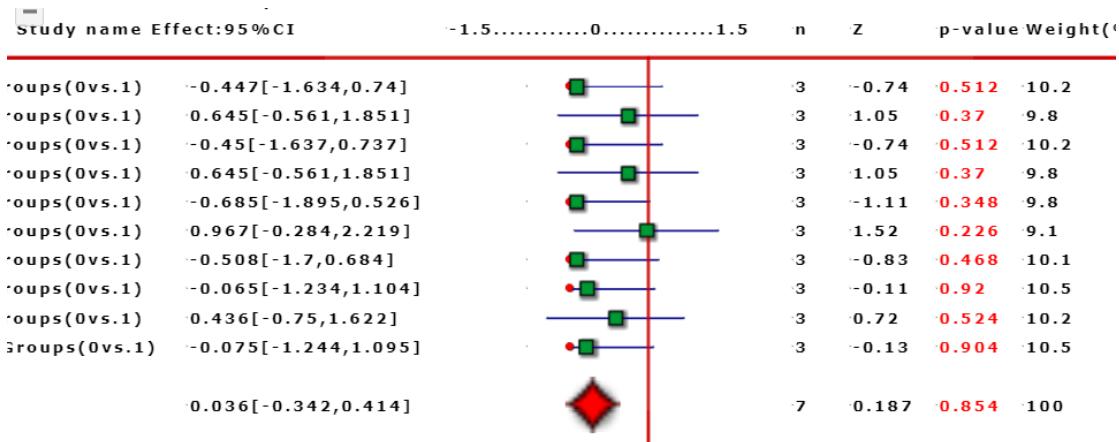
No.1. Groups(0 vs. 1), -0.446962131048137, 0.605519755920991, -1.634, 0.74, 3, -0.74, 0.512, 10.15
No.2. Groups(0 vs. 1), 0.644589229261143, 0.615336189704434, -0.561, 1.851, 3, 1.05, 0.37, 9.83
No.3. Groups(0 vs. 1), -0.449554106389863, 0.60562634678543, -1.637, 0.737, 3, -0.74, 0.512, 10.15
No.4. Groups(0 vs. 1), 0.644589229261143, 0.615336189704434, -0.561, 1.851, 3, 1.05, 0.37, 9.83
No.5. Groups(0 vs. 1), -0.6846377954762, 0.617734611796042, -1.895, 0.526, 3, -1.11, 0.348, 9.75
No.6. Groups(0 vs. 1), 0.967446998326597, 0.638398764904609, -0.284, 2.219, 3, 1.52, 0.226, 9.13
No.7. Groups(0 vs. 1), -0.507685412553928, 0.608173242776178, -1.7, 0.684, 3, -0.83, 0.468, 10.06
No.8. Groups(0 vs. 1), -6.49460140883488E-02, 0.59648125539822

Group if necessary from 1 to n at least 5 observed number for each group)
ectSize: Scale(>0;eg 0.9 or 1) Toward the right(>0) Multiply a ratio
ale(<=1) 

Extended to Two sides(<>0) Extreme = 

Submit  啟用 Windows 移至 [設定] 以啟用 V

427



428 `ogeneity test=Nil`

429 We can see that no DIF was found across all items in this

430 dataset between groups 0 and 1.

431

432 **Importantly, the label of group can be defined by**

433 **multiply groups, such as 01010, 10101 for five or a**

434 **smaller number of groups.**

435 **In this way, the group will be redirect to the number of**

436 **groups defined in this combo box using the formula of**

437 **mid (group, x, 1), whereas x is the number of groups**

438 **defined in the combo box.**

439

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears.

Visual displays DIF(Graph)

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

啟用

440

441

F. Polytomous response (6th week)

	K14																							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10	Item11	Item12	Item13	Item14	Item15	Item16	Item17	Item18	Item19	Item20	name	group		
2	3	3	3	3	3	1	3	2	2	1	0	0	0	0	0	0	0	1	0	1	1	0	0	
3	3	1	3	3	2	3	3	2	3	2	1	2	2	0	0	0	0	0	0	0	0	0	0	
4	3	3	3	3	3	3	3	1	1	2	2	3	0	0	0	0	0	0	0	0	0	0	0	
5	3	3	3	3	3	3	3	1	1	1	0	0	1	0	2	0	0	0	0	0	0	0	0	
6	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	
7	3	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	
8	3	3	3	3	3	3	3	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	
9	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	
10	3	2	3	2	3	2	3	2	1	2	1	2	1	2	1	0	1	0	1	0	1	0	1	
11	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	
12	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	
13	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	
14	3	2	2	2	2	2	2	2	2	2	0	1	1	1	1	1	1	1	1	1	3	0	1	
15	3	3	2	3	3	3	3	2	2	1	2	3	3	3	0	0	0	0	0	0	0	0	0	
16	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
17	3	3	1	3	3	3	3	3	0	2	3	2	3	0	0	1	0	1	0	0	0	0	0	
18	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	
19	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	
20	0	3	2	0	2	0	2	1	0	1	1	1	3	3	1	1	0	0	2	random respons	1	1	1	
21	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	rotate categories	1	1	
22	0	3	0	3	0	3	0	3	0	0	3	0	3	0	3	0	3	0	3	0	3	extreme flip-flop	1	
23	1	1	1	1	1	1	2	2	2	2	3	3	2	2	2	1	1	1	1	1	1	1	1	
24	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	1	
25	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	
26	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	1	

442

Copy and paste the data onto the input box

443

responses(Person in rows and Variables in columns)

2	3	3	2	2	2	1	1
1	1	1	1	folded pattern		1	
2	2	2	2	2	2	2	2
2	2	3	3	3	3	3	3
3	3	3	3	high reversal		1	
1	1	1	1	1	1	1	1
1	1	2	2	2	2	2	2
2	2	2	2	central reversal		1	
0	0	1	1	1	1	1	1
1	1	2	2	2	2	2	2
2	2	3	3	Guttman reversal		1	
0	0	0	0	0	0	0	0
0	0	3	3	3	3	3	3
3	3	3	3	extreme reversal			

Copy data and Paste them onto the box from Spread sheet
click on the submit bottom, the Result immediately appears

Visual displays DIF(Graph)

KIDMAP person# 1

Bubble Size 3

Submit

445

Visual displays None

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

446

447 With the label of none in display box, the description statistics

448 are below:

27=rows(including head labels)
 the number of persons=1 - 26



```

category_number=4, Max.=3, Min.=0 Cat. number Type(3=threshold)=4=RSM
Ranking
Residuals=0.03 previous vs. after= 0.07 Steps...1 difficulty=-0.32
Steps...2 difficulty=-0.19
Steps...3 difficulty=0.52
iteration...
10
Strata item= All items
Strata      Sum (n*k) Mean Expected Variance
C_1         738   480   1.54    738   437.68
B_2         100    40    2.5     99.99   19.34
ChSQ=       28.09 df= 20 prob.= 0.11
Ref. in Eq 4(click)
Strata_raw score item=2
Strata      Sum n Mean Expected Variance
C_1         52  24  2.17  51.47   18.78
B_2         5   2   2.5   5.53    0.47
ChSQ=       0.6 df= 1 prob.= 0.44
Ref. in Eq 4(click)
  
```

449

450 Persons are from 1 to 26(total rows are 27 including label head)

451 Category number=4 from 0 to 3

452 Therefore, there are three thresholds

453 Model residual stops at 0.03 in 10 iterations

454 Three step difficulties are -0.32, -0.19, and 0.52

455 Two strata are divided with numbers and means by stratum

456 from higher to lower in person measure. The ChSQ is 28.09 with

457 df=20, and prob.=0.11.

458 If the item 2 is considered about the model data fit to Rasch

459 model, the ChSQ=0.6 with df=1, and prob.=0.44, indicating

460 fitting to Rasch model rather well, similar to those shown in the

461 overall fit as shown below:

Strata_raw score item=1

Strata	Sumn	Mean	Expected	Variance	
C_1	49	24	2.04	48.54	20.6
B_2	5	2	2.5	5.45	0.55
ChSQ=		0.38	df= 1	prob.=	0.53

Ref. in Eq 4([click](#))

462

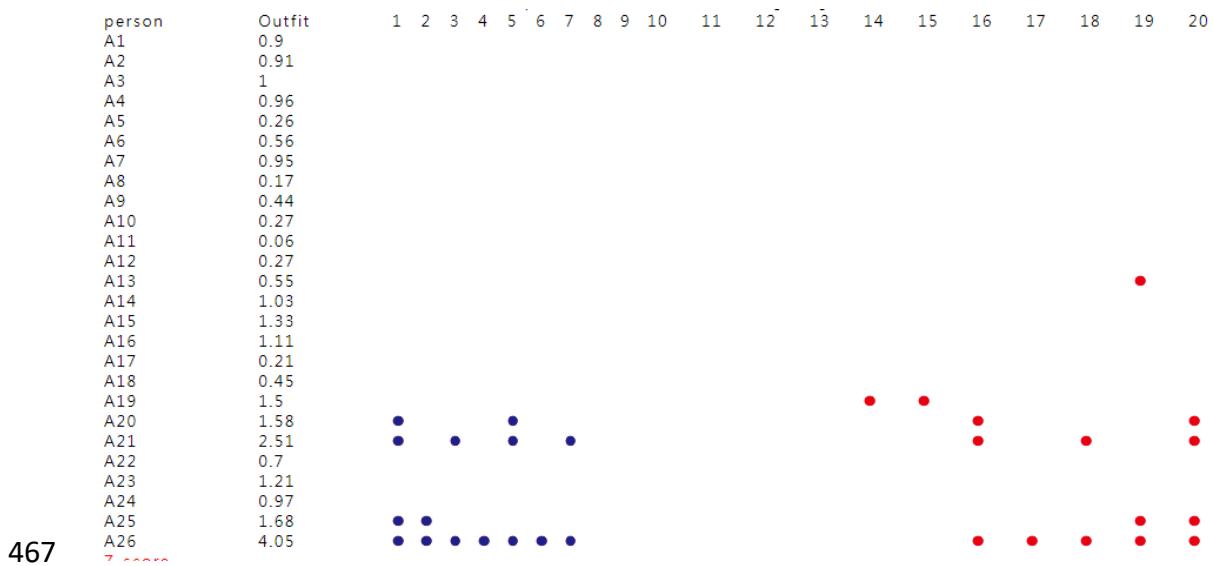
463

464 The following Tables are similar to the dichotomous scales

465 mentioned above.

N o. on	Pers on	Gra de	The se	Model	InfitM	OutfitM	Category number -4				Infit TD	
							NSQ	NSQ	1 q	Raw ore		
1	0	C03	-0.1	0.23	0.92	0.9	1	27		0.16	0.02	-0.1
			9									
2	0	C03	-0.0	0.23	0.91	0.91	1	30		0.16	0.02	-0.1
			2									
3	0	C03	-0.0	0.23	0.99	1	1	30		0.16	0.02	0.09
			2									
4	0	C03	-0.1	0.23	0.97	0.96	1	28		0.16	0.02	0.04
			3									
5	0	C03	-0.0	0.23	0.26	0.26	1	30		0.16	0.02	-2.8
			2									
6	0	C03	-0.0	0.23	0.54	0.56	1	30		0.16	0.02	-1.4
			2									
7	1	C03	-0.0	0.23	0.94	0.95	1	30		0.16	0.02	-0.0
			2									
8	1	C03	-0.0	0.23	0.17	0.17	1	30		0.16	0.02	-3.5
			2									
9	1	C03	0.08	0.23	0.44	0.44	1	32		0.16	0.02	-1.8
10	1	D05	-1.2	0.23	0.22	0.27	1	50		0.46	0.00	0.7

466



468

N	Ite	Difficu	Model	InfitMN	OutfitMN	Raw	Sc	2 SE(inf2	SE(out	Infitz
o.	m	lty	SE	SQ	SQ	ore	it)	fit)	TD	
1	-0.5	0.22	1.68	1.6	54	0.16	0.02	1.51		
2	-0.65	0.23	1.27	1.24	57	0.18	0.02	0.69		
3	-0.45	0.21	1.05	1.02	53	0.16	0.02	0.26		
4	-0.7	0.23	1.14	1.11	58	0.2	0	0		
5	-0.45	0.21	1.2	1.17	53	0.16	0.02	0.59		
6	-0.45	0.21	0.92	0.9	53	0.16	0.02	-0.06		
7	-0.45	0.21	1.08	1.04	53	0.16	0.02	0.33		
8	-0.28	0.21	0.69	0.69	49	0.14	0	0		
o	o	o	o	o	o	o	o	o	o	o

469

Person	RAW_SCOUNT	MEAS.	SE	Infit	Outfit
MEAN	5.9	10	1.03	1.1	1.01
S.D.	2.02	0	2.45	0.11	0.53
MAX.	8	10	4.85	1.27	2
MIN.	2	10	-3.13	0.9	0.45
REAL RMSE	1.23	ADJ.SD 2.12		SEPARATION 1.73	Person RELIAB. 0.75
MODEL RMSE	1.08	ADJ.SD 2.19		SEPARATION 1.98	Person RELIAB. 0.8
Cronbach's alpha=	0.84	Step delta=	0		
Item	RAW_SCOUNT	MEAS.	SE	Infit	Outfit
MEAN	5.3	9	0	1.17	1
S.D.	2.69	0	2.98	0.15	0.34
MAX.	8	9	4.64	1.29	1.44
MIN.	1	9	-2.94	0.91	0.41
REAL RMSE	1.27	ADJ.SD 2.69		SEPARATION 2.12	Item RELIAB. 0.82
MODEL RMSE	1.08	ADJ.SD 2.73		SEPARATION 2.32	Item RELIAB. 0.84

470	ANOVA Virable SS df MSS F 89 Between 5.83 1 5.83 0.84 p Within 48.45 7 6.92 =FDIST(0.84,1,7) TSS 54.28 8 All mean= p-value(Click on Me) 0.59
-----	--

471 Users are suggested to select the two of Summary Tables and
 472 ANOVA as did in the dichotomous scales.

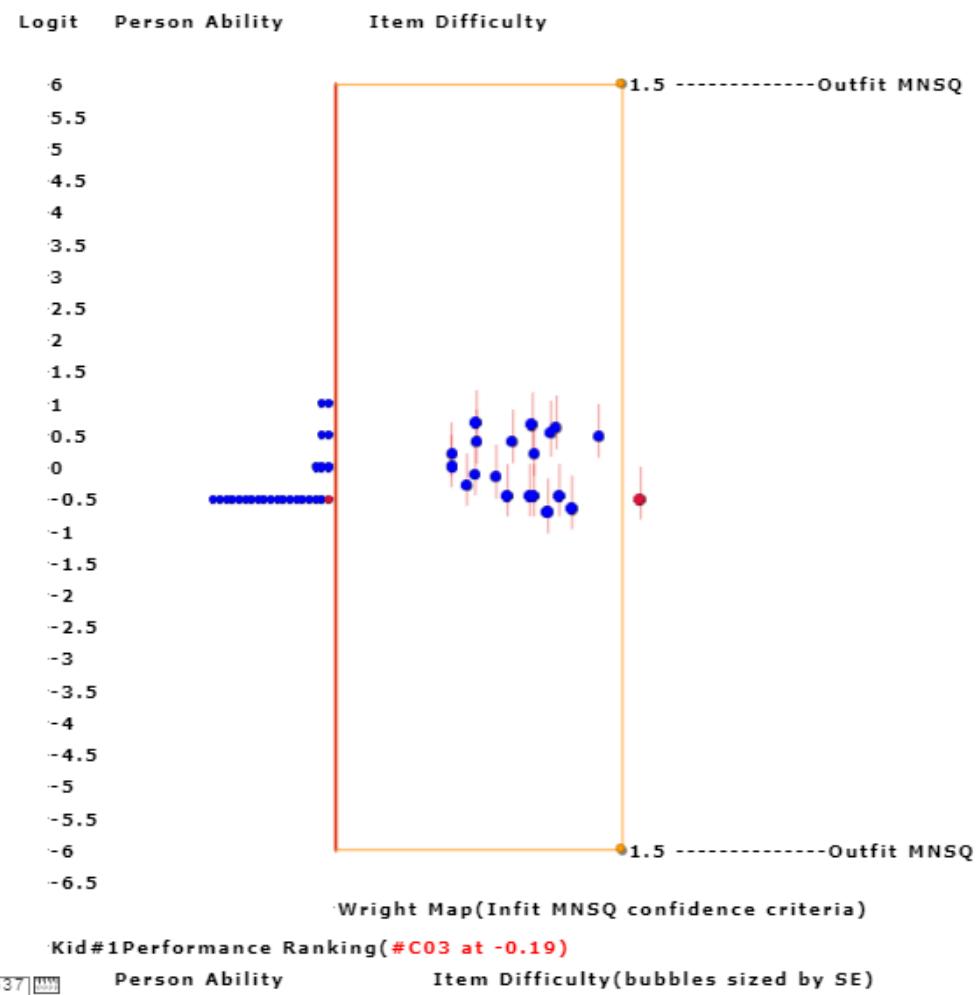
473 Notes: We should know that the difference and relationship
 474 between t and F tests of ANOVA in meaning and implication.

475 G. Polytomous response in visualizations (7th 476 week)

Visual displays [redacted]
 KIDMAP person#
 Bubble Size

 WrightMap dotted with dashes [redacted]
 Fit Types [redacted]
 adjustwright Wright move to left
 ICC Item#

477



478

479 Note. Person in red is from the definition of selection in person

480 #

481 The vertical dash lines represent the range of step
 482 difficulties which is different from those from dichotomous
 483 scales with item difficulties only with additional step difficulties
 484 in RSM.

Click on the submit button, the result immediately appear

Visual displays Wright Map
KIDMAP person# 1
Bubble Size 3
Submit

WrightMap dotted with dashes No

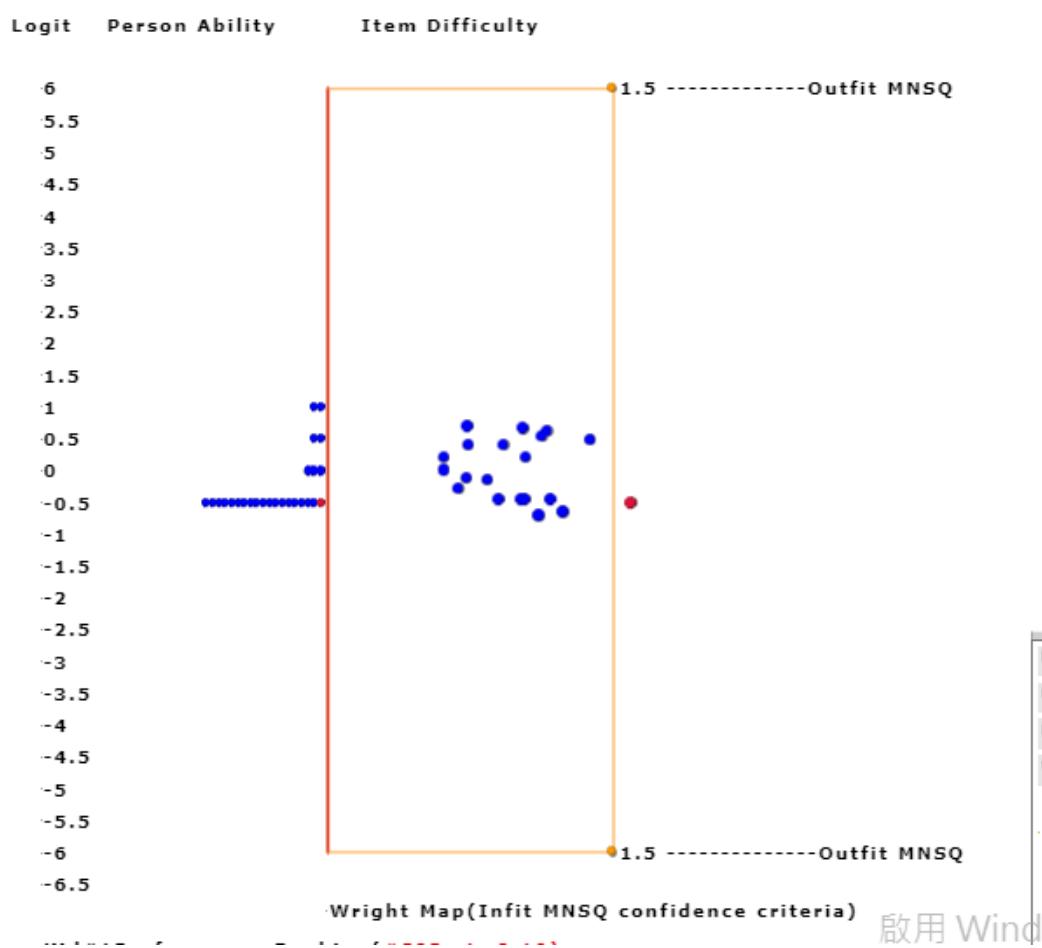
Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

485



486

Visual displays Wright Map
KIDMAP person# 1
Bubble Size 3
Submit

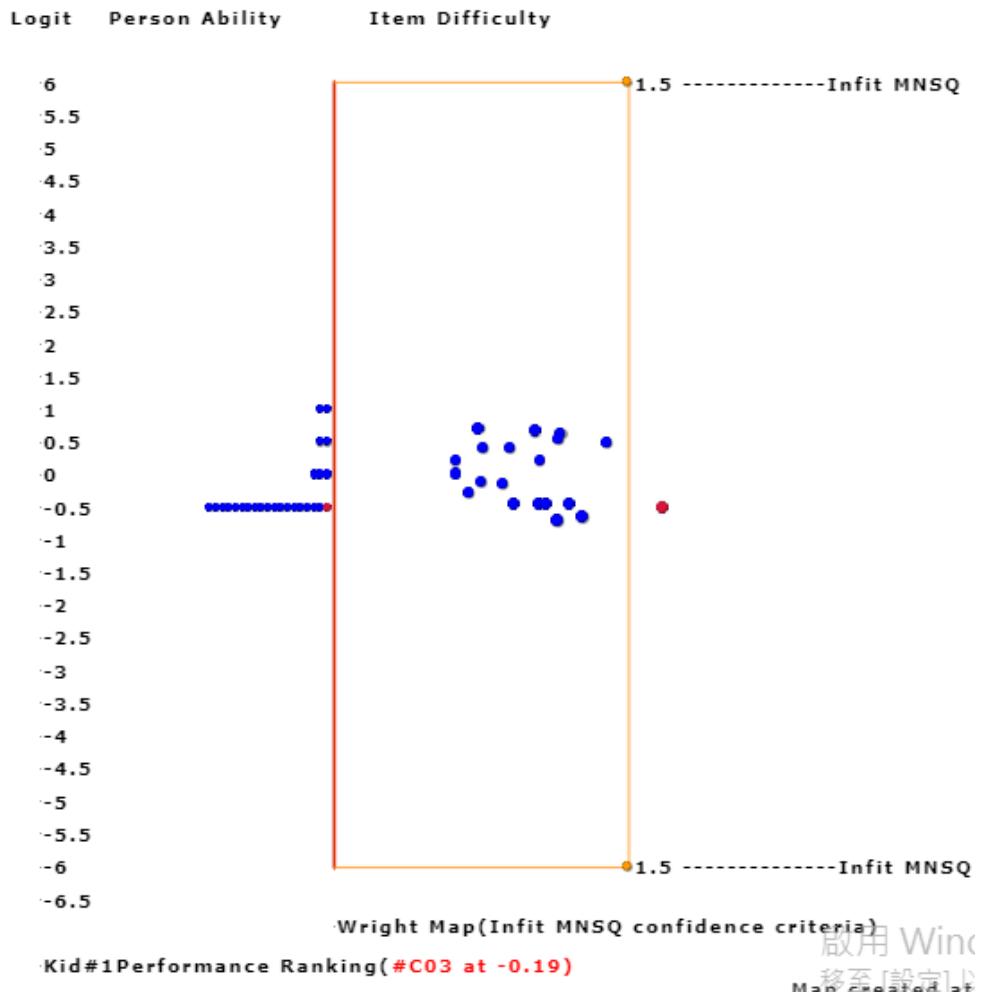
WrightMap dotted with dashes No

Fit Types Infit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

487



488

Visual displays

KIDMAP person#

Bubble Size

WrightMap dotted with dashes

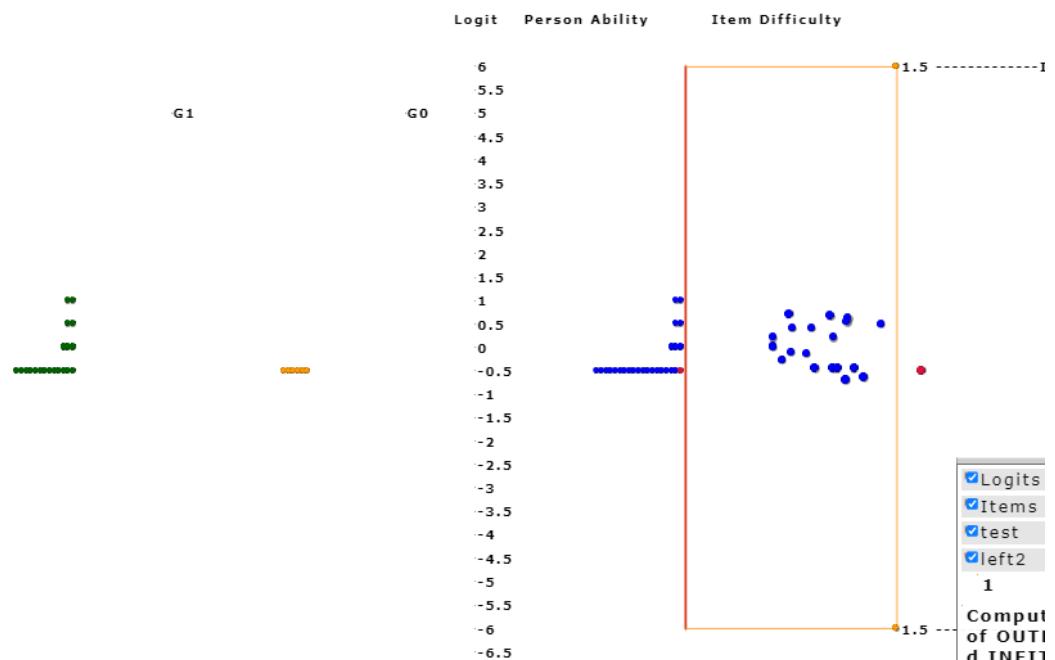
Fit Types

adjustwright Wright move to left

ICC Item#

Group#

489



491 By group

492

Visual displays KIDMAP

KIDMAP person# 1

Bubble Size 3

Submit

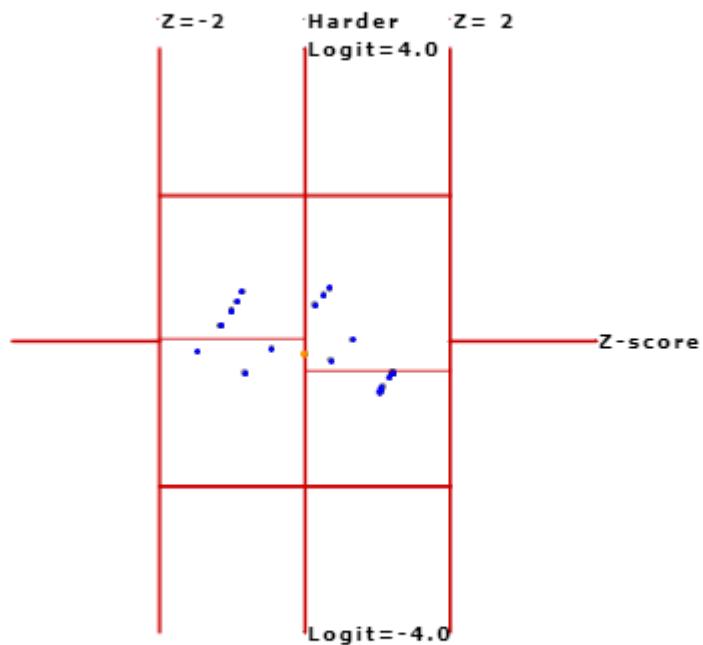
WrightMap dotted with dashes No

Fit Types Infit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1



493

`1(theta=-0.19))`

Visual displays KIDMAP

KIDMAP person# 5

Bubble Size 5

Submit

WrightMap dotted with dashes No

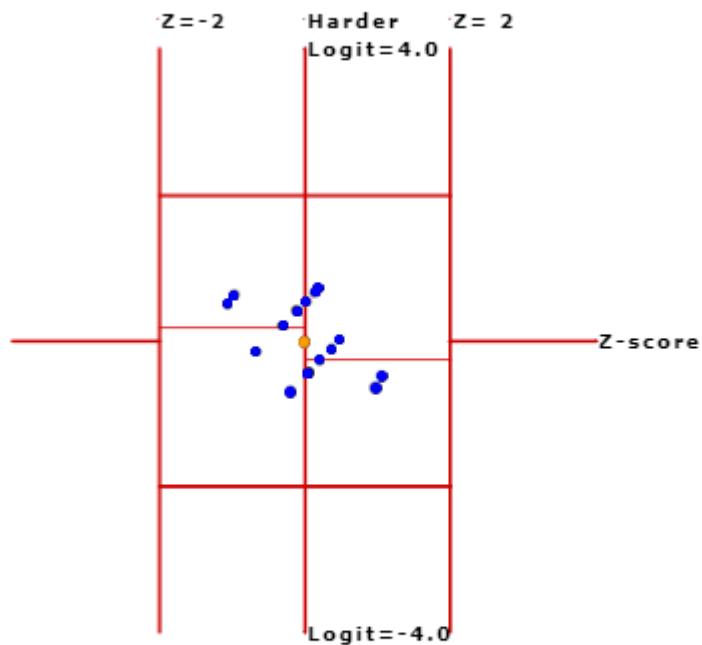
Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

494



`-5(theta=-0.02))`

495

Visual displays [ICC_ca

KIDMAP person#

Bubble Size

Submit

WrightMap dotted with dashes

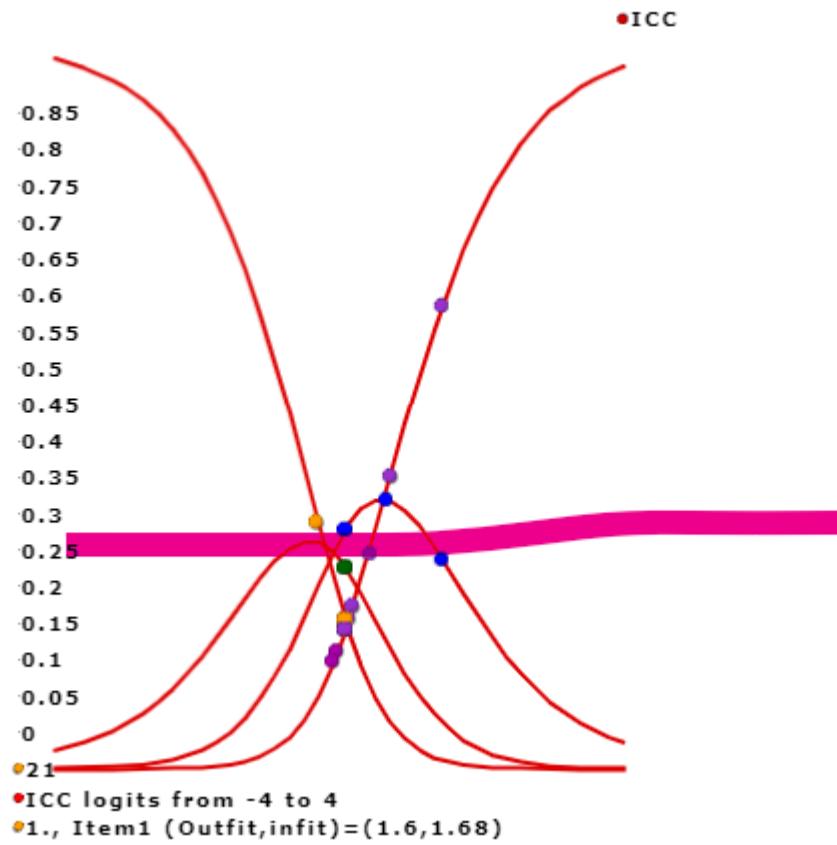
Fit Types

adjustwright Wright move to left

ICC Item#

Group#

496

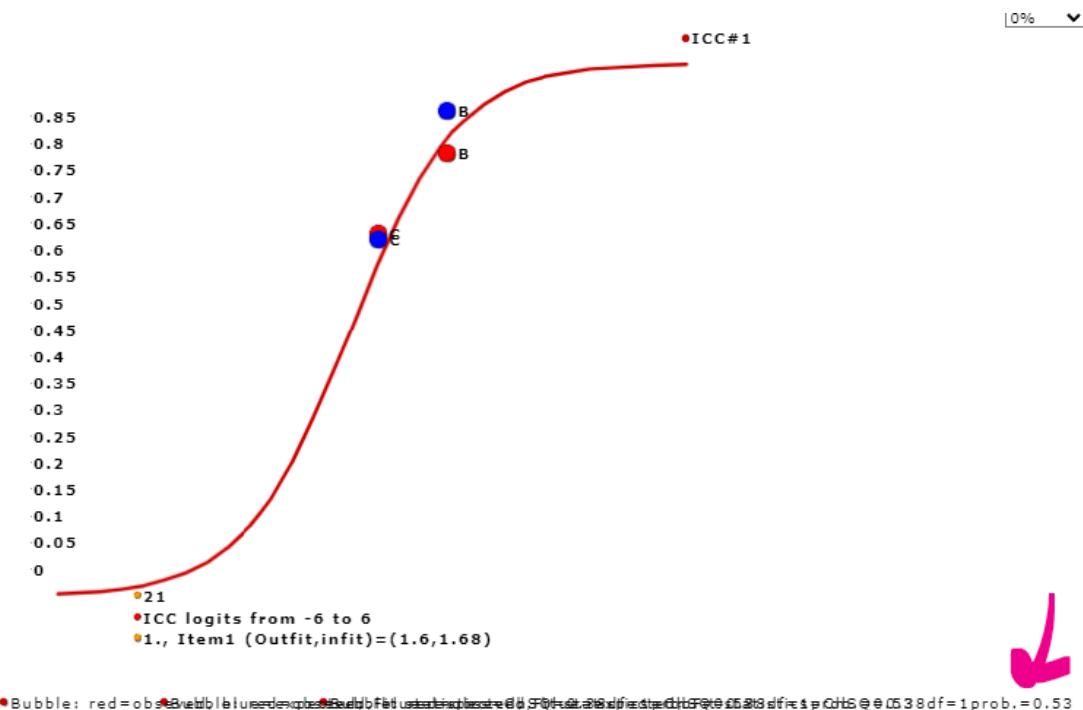


497

498 **Note. Above the red line, we can see that which person**

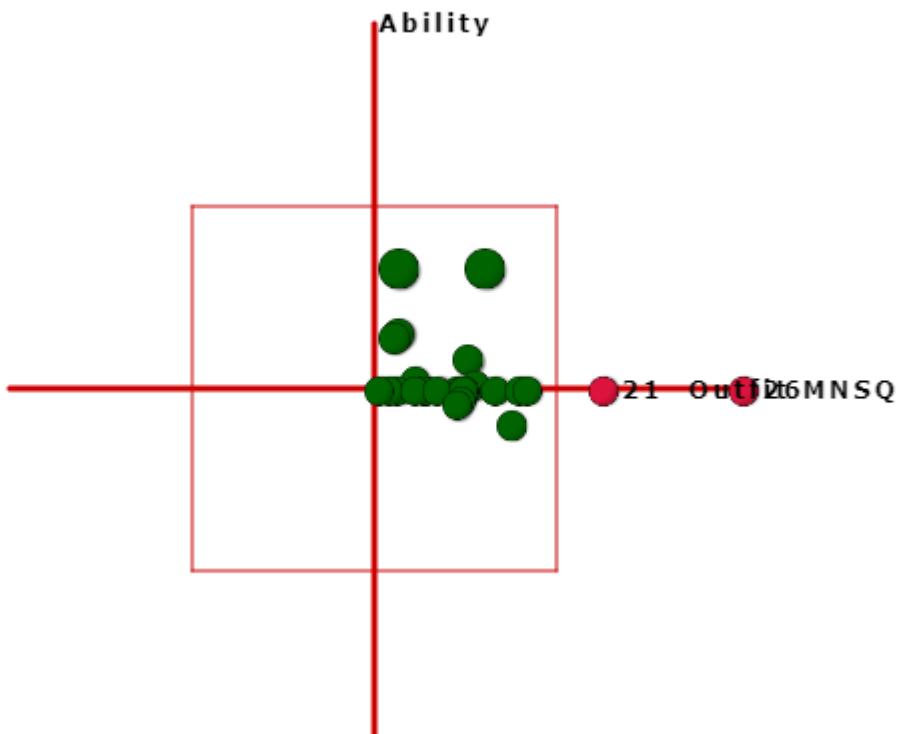
499 **responds aberrantly under the line on the item defined in the**

500 **conformation step.**

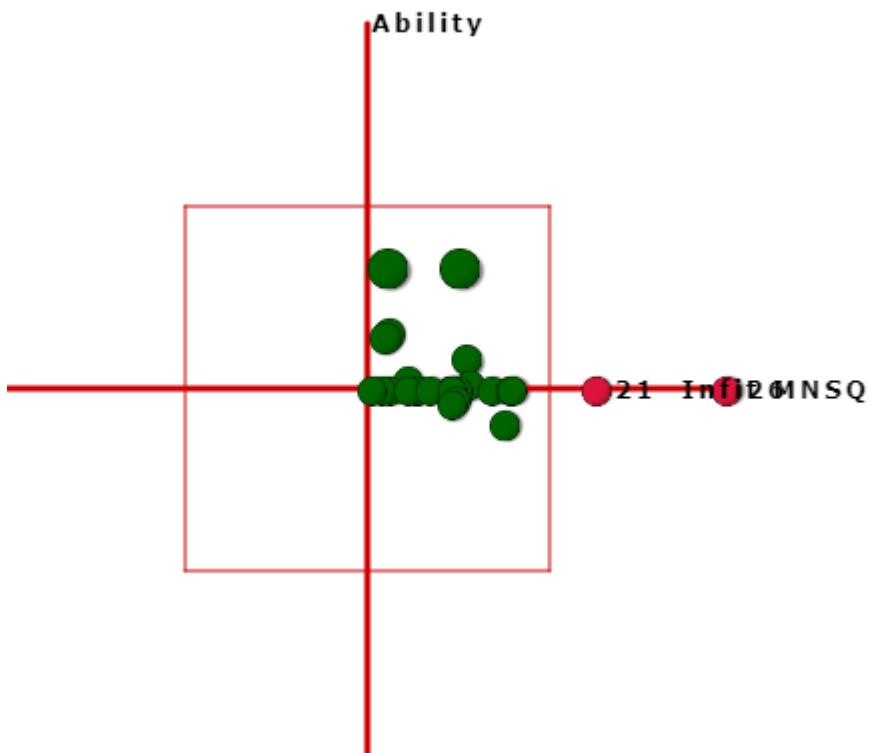


501

502 Only two strata are involved in this dataset. The item 1 has a
503 good model data fit to Rasch model with prob.=0.53



504



505

Visual displays | Simulation

KIDMAP person#

Bubble Size

Fit Types

adjustwright Wright move to left

ICC Item#

Group#

506

```

Simulation data generated
Item1,Item2,Item3,Item4,Item5,Item6,Item7,Item8,Item9,Item10,Item11,Item12,Item13,Item14,Item15,Item16,Item17,Item18,Item19,Item20,name,group
2,2,1,2,2,1,2,2,1,1,0,3,0,2,0,0,2,0,3,0,modelled,0
2,2,2,1,2,2,3,1,2,3,2,0,0,1,2,2,0,0,0,2,modelled,0
3,2,3,1,0,3,2,2,2,2,1,0,1,3,0,0,1,1,1,modelled,0
2,3,1,1,3,2,2,3,1,2,2,3,1,2,1,0,1,0,0,1,modelled,0
1,2,2,2,3,2,2,2,3,3,0,2,0,3,2,0,0,1,0,2,most expected,0
1,2,2,0,0,3,0,1,1,0,2,3,3,3,1,1,1,0,0,most likely,0
1,2,2,3,2,3,1,0,2,1,1,3,1,1,2,1,0,1,0,0,high discrimination,1
2,3,0,3,3,2,0,2,3,1,2,2,2,1,3,1,2,3,2,0,low discrimination,1
2,3,3,3,0,2,2,3,0,2,2,1,0,0,2,1,1,1,1,tight progression,1
3,3,3,3,3,3,3,3,3,3,2,1,3,3,3,2,3,0,high (low) categories,1
3,3,2,2,3,1,2,3,1,3,1,2,3,2,1,1,2,2,0,3,2 central categories,1
2,2,2,3,3,3,2,2,2,3,2,0,1,3,0,2,2,1,0,3,only 3 categories,1
3,3,3,3,2,3,2,3,2,3,3,3,2,1,2,1,0,0,2,0,noisy outliers,1
0,3,1,2,3,3,3,2,0,2,2,3,2,2,0,0,3,2,erratic transitions,1
1,1,2,3,2,2,2,3,2,0,1,2,2,3,2,2,0,0,3,2,erratic transitions,1
3,2,0,2,1,1,2,0,3,0,2,3,2,0,1,0,0,2,extreme categories,1
3,2,0,2,1,1,2,0,3,0,2,3,2,0,1,0,0,0,1,noisy progression,1
2,2,2,3,1,2,2,3,1,3,0,2,1,3,1,2,1,3,0,one category,1
2,0,1,1,2,2,2,3,1,3,1,2,2,3,1,0,1,2,1,0,0,2,central flip-flop,1
3,2,0,2,1,1,2,2,2,3,1,3,1,2,2,1,0,1,2,1,0,0,2,noisy progression,1
2,2,2,3,3,3,2,1,2,1,1,0,0,2,0,0,0,0,1,random responses,1
2,3,1,1,3,2,2,3,1,2,2,2,1,2,0,0,1,2,0,1,rotate categories,1
3,2,0,2,3,2,2,2,3,2,3,2,2,3,2,0,0,1,2,2,extreme flip-flop,1
0,2,2,3,0,2,3,1,1,0,2,2,1,2,2,0,1,1,3,1,folded pattern,1
3,3,3,3,3,3,3,2,2,3,3,3,3,3,3,0,3,3,2,2,high reversal,1
3,1,2,3,1,3,2,2,3,2,2,2,2,0,3,0,0,0,1,central reversal,1
3,3,1,1,2,3,2,0,1,3,0,2,1,1,0,2,2,2,3,2,Guttman reversal,1
2,3,2,3,2,3,3,3,2,1,2,2,0,0,2,0,0,2,0,extreme reversal,1
2,0,1,1,2,2,3,1,2,2,1,3,0,1,2,1,1,0,0,1,central flip-flop,1

```

507

responses(Person in rows and Variables in columns)

3,3,3,3,2,3,2,3,2,3,3,3,2,1,2,1,0,0,2,0,noisy outliers,1
0,3,1,2,3,3,3,2,0,2,2,3,2,2,0,0,3,2,erratic transitions,1
1,1,2,3,2,2,2,3,2,0,1,2,2,3,2,0,1,0,0,2,extreme categories,1
3,2,0,2,1,1,2,0,3,0,2,3,2,0,0,0,1,2,2,noisy progression,1
2,2,2,3,1,2,2,3,0,2,0,3,1,3,2,1,3,1,3,0,one category,1
2,0,1,1,2,2,2,3,1,3,1,2,2,3,1,0,1,2,1,1,0,0,2,central flip-flop,1
2,1,2,3,3,3,2,1,2,1,1,0,0,2,0,0,0,0,1,random responses,1
2,3,1,1,3,2,2,3,1,2,2,2,1,2,0,0,1,2,0,1,rotate categories,1
3,2,0,2,3,2,2,2,3,2,3,2,2,3,2,0,0,1,2,2,extreme flip-flop,1
0,2,2,3,0,2,3,1,1,0,2,2,1,2,2,0,1,1,3,1,folded pattern,1
3,3,3,3,3,3,3,2,2,3,3,3,3,3,3,0,3,3,2,2,high reversal,1
3,1,2,3,1,3,2,2,3,2,2,2,2,0,3,0,0,0,1,central reversal,1
3,3,1,1,2,3,2,0,1,3,0,2,1,1,0,2,2,2,3,2,Guttman reversal,1
2,3,2,3,2,3,3,3,2,1,2,2,0,0,2,0,0,2,0,extreme reversal,1

Copy data and Paste them onto the box from Spread sheet
Click on the submit bottom, the Result immediately appears.

Visual displays

KIDMAP person#

Bubble Size

Fit Types

adjustwright Wright move to left

ICC Item#

Group#

508

μ_1	μ_{1+}	μ_{-1+}	μ_{++}	μ_{+-}	μ_0	μ_{1+}	μ_{-1+}	μ_{++}	μ_{+-}	μ_0	μ_{1+}	μ_{-1+}	μ_{++}	μ_{+-}	μ_0
12	-0.47	0.23	1.27	1.29	54	0.18	0.002	0.69	51.58	0.0	0.67	0.0	3	0.0	0.67
13	0.56	0.21	0.91	1.01	31	0.14	0.002	-0.14	1.94	0.1	0.77	0.1	1	0.1	0.77
14	-0.09	0.21	1.06	1.02	46	0.14	0.002	0.28	3.86	0.1	0.73	0.1	6	0.1	0.73
15	0.04	0.21	1.15	1.11	43	0.14	0.002	0.52	20.62	0.0	0.7	0.0	8	0.0	0.7
16	0.99	0.23	1.15	1.16	22	0.18	0.002	0.46	29.54	0.0	0.7	0.0	2	0.0	0.7
17	0.79	0.22	0.93	0.88	26	0.16	0.002	-0.04	-24.3	0.1	0.76	0.1	1	0.1	0.76
18	0.79	0.22	0.77	0.72	26	0.16	0.002	-0.47	-60.44	0.1	0.8	0.1	8	0.1	0.8
19	0.61	0.21	1.58	1.55	30	0.14	0.002	1.49	91.55	0.0	0.6	0.0	3	0.0	0.6
20	0.61	0.21	1.19	1.36	30	0.14	0.002	0.62	62.84	0.0	0.69	0.0	3	0.0	0.69

STRUCTURE-THRESHOLD MEASURE ANCHOR FILE FOR LIKING FOR SCIENCE (Wrig & Masters p.18)

CATEGORY Rasch-Andrich threshold

$$1. = -0.29$$

$$2. = -0.48$$

3 = 0.77

啟用 Windows

移至 [設定] 以啟用 Windows

509

510 We can see that the simulation data fit Rasch model rather well

511 H.Polytomous response in visualizations (8th week)

512

Visual displays Cronban

KIDMAP person#

Bubble Size

Submit

Fit Types Infit MNSQ

adjustwright Wright move to left

ICC Item#

Group#

513

514

515

corr_k is the average (Spearman) correlation coefficient computed on the ranks of all pairs of raters.

<http://www.real-statistics.com/reliability/kendalls-w/>

Kendall d chisquare(Col=item ,ro corr_k f Cronban alpha (Co Cronban alpha(Col=item,
l_w f w for judge) or W l=person) in tradition)
0.17 1 =round(pro,2) 0.14 0.84 0.69
9

Steps...1 -0.29

Steps...2 -0.48

Steps...3 0.77

iteration...

啟用 Windows
移至 [設定] 以啟用 Windows。

516

Visual displays Kendall

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Infit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

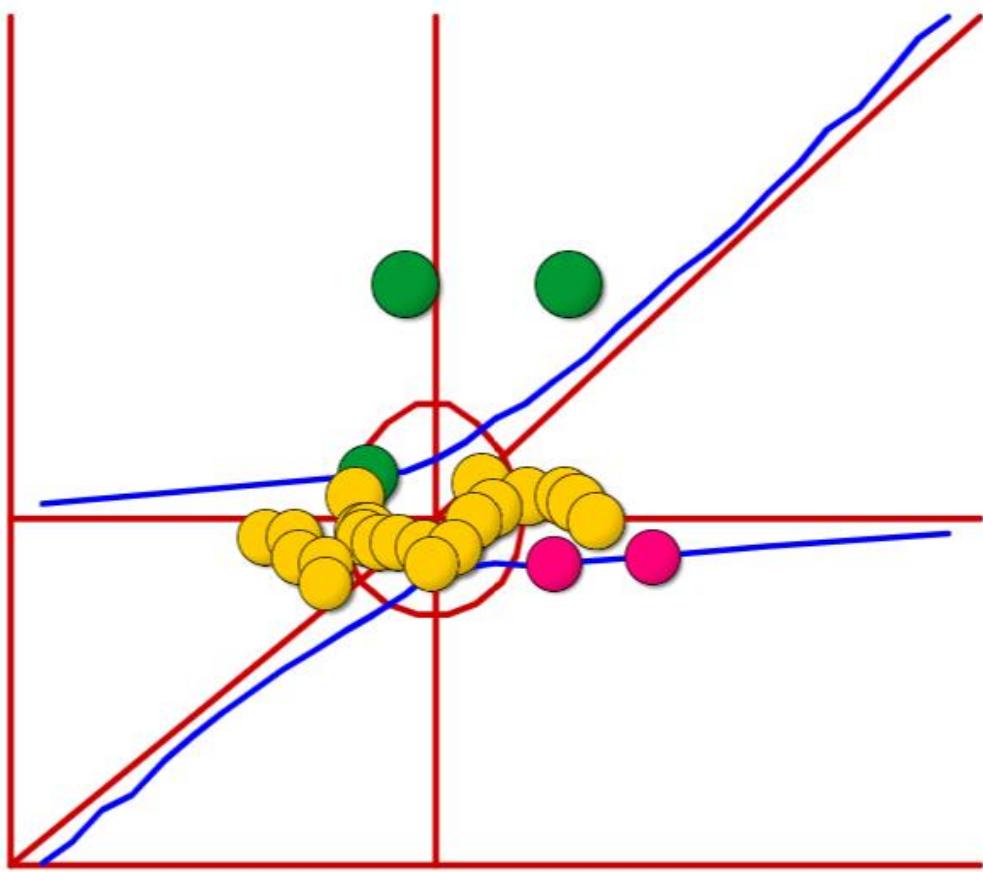
517

pairs of raters.

<http://www.real-statistics.com/reliability/kendalls-w/>

Kendall d chisquare(Col=item ,ro corr_k f Cronban alpha (Co Cronban alpha(Col=item,
l_w f w for judge) or W l=person) in tradition)
0.17 1 =round(pro,2) 0.14 0.84 0.69
9

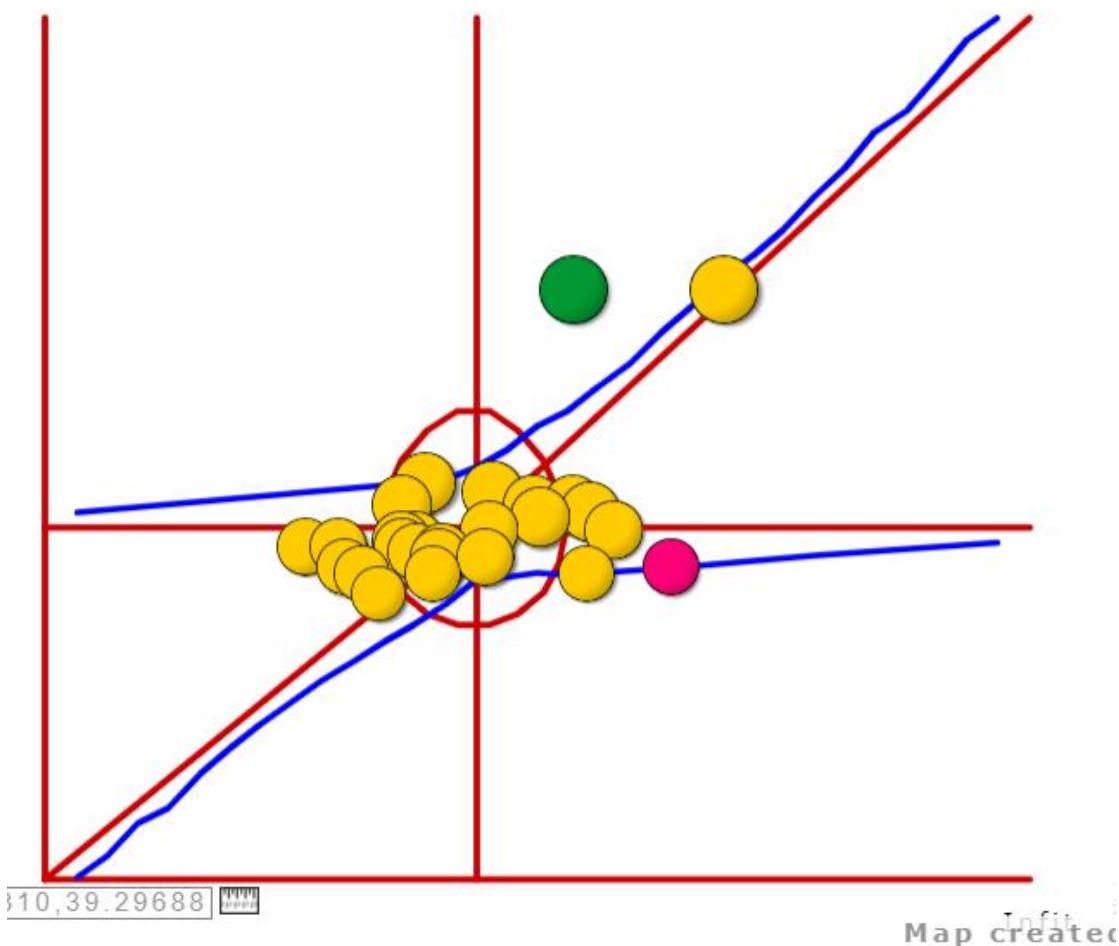
518



519

21.01563|

Outfit
效用
效用

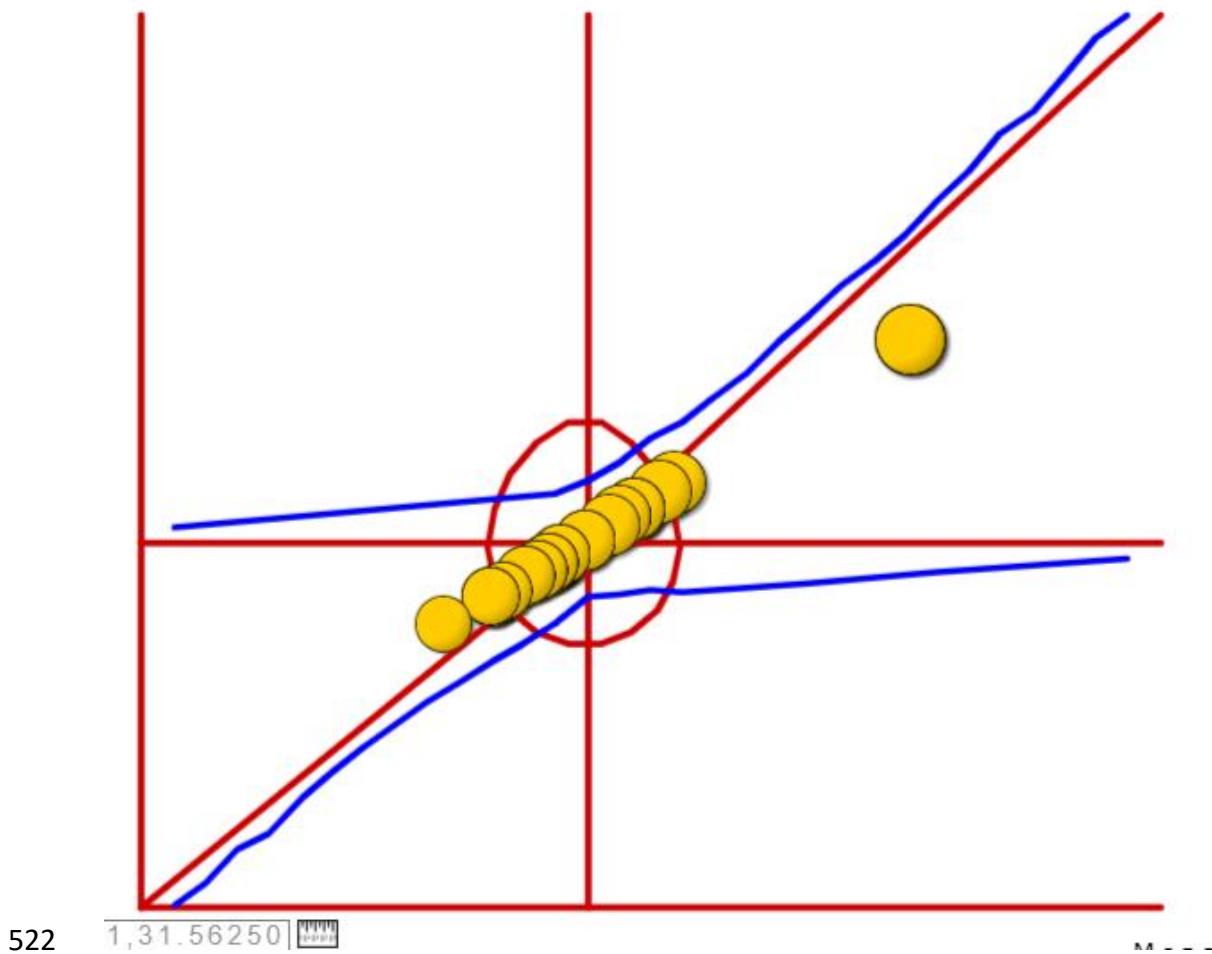


520

Infit Map created

Person	RAW_SCOUNTMEAS.	SE	Infit	Outfit
MEAN	33.5	0.18	0.26	1.04
S.D.	7.37	0	0.02	0.32
MAX.	53	20	1.81	0.4
MIN.	22	20	-0.54	0.24
REAL RMSE	0.28	ADJ.SD 0.47	SEPARATION 1.68	Person RELIAB. 0.74
MODEL RMSE	0.47	ADJ.SD 0.48	SEPERATION 1.81	Person RELIAB. 0.77
Cronbach's alpha=	0.84	Step delta=		
	-0.29	-0.48		0.77
Item	RAW_SCOUNTMEAS.	SE	Infit	Outfit
MEAN	43.55	26 0	0.22	1.01
S.D.	11.62	0	0.54 0.03	0.2
MAX.	60	26	0.99 0.26	1.58
MIN.	22	26	-0.83 0.21	0.66
REAL RMSE	0.23	ADJ.SD 0.49	SEPARATION 2.13	Item RELIAB. 0.82
MODEL RMSE	0.47	ADJ.SD 0.49	SEPERATION 2.19	Item RELIAB. 0.83 vs

521



523

524

525

526

Visual displays DIF(2 groups)

KIDMAP person# 5

Bubble Size 5

Submit

WrightMap dotted with dashes No

Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

527

STRUCTURE-THRESHOLD MEASURE ANCHOR FILE FOR LIKING FOR SCIENCE (Wright & Masters p.18)

CATEGORY Rasch-Andrich threshold

1.=-0.32
2.=-0.19
3.=0.52

Thresholds Group 1 Group 2
Step1 -1.15 -0.39
Step2 0.11 -0.17
Step3 1.05 0.56

DIF class/group specification is: Pairwise DIF=0,1(1)(If an item has a perfect score, the delta is assigned to th an overall delta)

KID	Obs-ExpDIF	DIF	KID	Obs-ExpDIF	DIF	DIF	JOINT Rasch-Welch Item						
CLASS	Average MEASURES.E.	CLASS	Average MEASURES.E.	CLASS	MEASURES.E.	CONTRASTS.E.	t	sig.	df	Name			
0	0.01	-6.34	4.24	1	0	-0.15	0.24	-6.19	4.25	1.46	0.204	5	1
0	0.09	-1.74	0.64	1	-0.01	-0.45	0.25	-1.29	0.69	1.86	0.122	5	2
0	0.06	-2.42	0.85	1	0	-0.15	0.24	-2.27	0.88	2.57	0.05	5	3
0	0.06	-2.42	0.85	1	-0.01	-0.45	0.25	-1.97	0.89	2.21	0.078	5	4
0	0.09	-1.74	0.64	1	0	-0.21	0.24	-1.53	0.68	2.25	0.074	5	5
0	0.11	-1.01	0.5	1	-0.01	-0.33	0.25	-0.69	0.56	1.23	0.274	5	6
0	0.09	-1.74	0.64	1	0	-0.21	0.24	-1.53	0.68	2.25	0.074	5	7
0	0.05	-0.12	0.44	1	-0.01	-0.33	0.25	0.21	0.51	0.4	0.706	5	8
0	0.07	-0.32	0.45	1	0	0.12	0.23	-0.44	0.51	0.87	0.424	5	9
0	0.05	-0.12	0.44	1	0	-0.1	0.24	-0.02	0.5	0.05	0.962	5	10
0	-0.05	0.95	0.5	1	0	0.07	0.23	0.88	0.55	1.6	啟用 Windows	11	

528

Visual displays DIF(Graph)

KIDMAP person# 5

Bubble Size 5

Submit

WrightMap dotted with dashes No

Fit Types Outfit MNSQ

adjustwright Wright move to left 0

ICC Item# 1

Group# 1

responses(rows for each entity)

```
No.1. Groups(0 vs. 1),-1.24009686274482,0.482464893209689,-2.186,-0.294,5,-2.57,0.05,4.89
No.2. Groups(0 vs. 1),-1.01659437016583,0.472305867522773,-1.942,-0.091,5,-2.15,0.084,5.1
No.3. Groups(0 vs. 1),-1.62852111754451,0.504182586864246,-2.617,-0.64,5,-3.23,0.024,4.48
No.4. Groups(0 vs. 1),-1.385178213321,0.489996896752754,-2.346,-0.425,5,-2.83,0.036,4.74
No.5. Groups(0 vs. 1),-1.23934647074737,0.48242781147737,-2.185,-0.294,5,-2.57,0.05,4.89
No.6. Groups(0 vs. 1),-0.58363204341891,0.45798365646157,-1.481,0.314,5,-1.27,0.26,5.43
No.7. Groups(0 vs. 1),-1.23934647074737,0.48242781147737,-2.185,-0.294,5,-2.57,0.05,4.89
No.8. Groups(0 vs. 1),0.179391494333836,0.451461398055958,-
```

Group if necessary from 1 to n at least 5 observed number for each group)

EffectSize: 1 Scale(>0;eg 0.9 or 1) 0 Toward the right(>0) 0 Multiply a ratio on scale(<=1

1

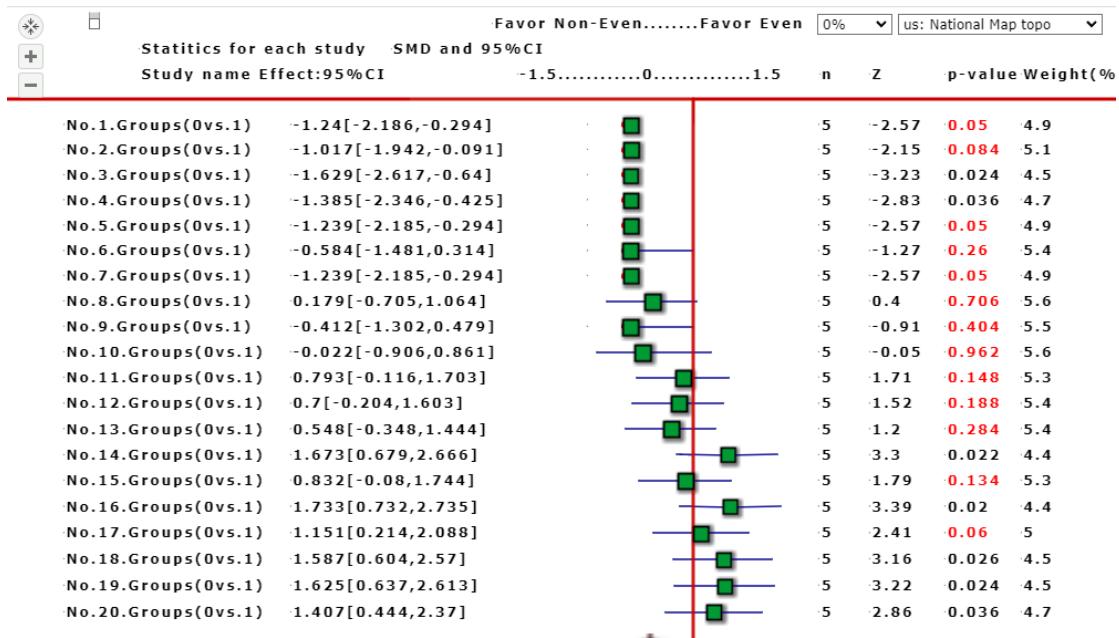
Extended to Two sides(<>0) 0 Extreme= 1

啟用 Windows

移至 [設定] 以啟用 Windows

Submit

530



531

532 Note. the top five items display the DIF exhibition

533

534 I. Rating Scale Model in visualizations (9th week)

535 (To interpret them by yourself)

	A	B	C	D	E	F	G	H	I	J	K	L
1	Watch bird	Read book	Read book	Watch gras	Find bottle	Look up sti	Watch anim	Look in sid	Learn week	Listen to bi	Find where	Go to mus
2	1	2	1	1	1	0	2	0	1	2	2	2
3	2	2	2	2	2	2	2	2	2	2	2	2
4	2	2	1	1	0	1	1	0	1	2	2	2
5	1	0	1	0	0	1	0	1	2	2	1	2
6	1	0	1	0	1	0	1	0	0	1	1	1
7	1	0	1	1	2	1	1	0	1	1	1	1
8	2	2	2	0	0	2	2	2	0	2	2	2
9	2	2	1	0	0	2	1	0	2	2	2	2
10	0	1	1	0	1	0	0	1	1	2	1	2
11	2	1	0	0	0	1	0	1	2	2	2	2
12	2	2	2	0	0	1	1	1	0	2	2	2
13	0	1	0	0	2	2	0	1	0	1	2	2
14	1	2	1	1	0	0	0	1	0	2	1	2
15	2	1	1	0	0	2	0	2	1	2	0	2

536

0	2	1	2	0	0	2	0
1	Solomon	1					
2	0	1	2	0	1	0	1
2	2	2	1	0	2	0	1
1	0	2	2	0	2	0	2
2	Ryne	1					
2	2	2	0	0	2	2	0
0	2	2	2	2	2	2	2
2	2	2	0	2	2	0	1
2	Ray	1					
1	2	0	0	1	1	0	1
1	2	1	2	2	2	2	1
0	2	2	0	2	0	0	1
0	Linus	1					

Copy data and Paste them onto the box from Spread sheet
Click on the submit bottom, the Result immediately appears.

Visual displays KanoPlotRawScore

KIDMAP person# 1

Bubble Size 3

Submit

Fit Types Infit MNSQ

adjustwright Wright move to left 0

啟用 Win
移至 [設定]

ICC Item# 1

Group# 1

76=rows(including head labels)
the number of persons=1 - 75



category_number=3, Max.=2, Min.=0 Cat. number Type(2=threshold)=4=RSM
Ranking

Residuals=0.04 previous vs. after= 0.06 Steps...1 difficulty=-0.86

Steps...2 difficulty=0.86

iteration...

23

Strata item= All items

Strata	Sum	(n*k)	Mean	Expected	Variance
C_1	1333	1200	1.11	1332.99	401.96
A_2	147	75	1.96	147	2.7
B_3	854	525	1.63	853.98	119.58
D_4	40	75	0.53	40	20.72
ChSQ=	47.59	df=	75	prob.=	0.99

Ref. in Eq 4(click)

Strata_raw score item=1

Strata	Sum	n	Mean	Expected	Variance
C_1	60	48	1.25	63.29	18.91
A_2	6	3	2	5.96	0.04
B_3	41	21	1.95	38.06	3.39
D_4	2	3	0.67	1.68	1.13
ChSQ=	3.25	df=	3	prob.=	0.36

Ref. in Eq 4(click)

537

538

539

16	0.6	0.19	0.97	0.94	83	15.28	0.002	22.05	-7	0.1	0.75	0.7
17	0.16	0.19	0.65	0.58	95	19.86	0.002	28.66	-56.99	0.2	0.83	0.8
18	-3.16	0.47	1.51	1.22	145	608.8	0.002	878.73	23.5	0.0	0.61	0.6
19	-2.49	0.36	1.09	1.09	141	258.38	0.002	372.94	10	0.0	0.72	0.7
20	1.84	0.2	1.34	1.81	50	9.46	0.002	13.66	74.92	0.0	0.66	0.5
21	-0.86	0.22	0.85	0.64	119	43.88	0.002	63.33	-47.44	0.1	0.78	0.8
22	0.08	0.2	0.83	0.73	97	20.88	0.002	30.14	-34.17	0.1	0.79	0.8
23	2.19	0.21	2.42	4.08	42	8.8	0.002	12.73	204.54	-0.00	0.42	0.2
24	-0.31	0.2	0.9	0.78	107	27.78	0.002	40.1	-27.27	0.1	0.77	0.8
25	0.53	0.19	0.8	0.73	85	15.9	0.002	22.95	-34.17	0.1	0.79	0.8

STRUCTURE-THRESHOLD MEASURE ANCHOR FILE FOR LIKING FOR SCIENCE (Wrigt & Masters p.18)

CATEGORY Rasch-Andrich threshold

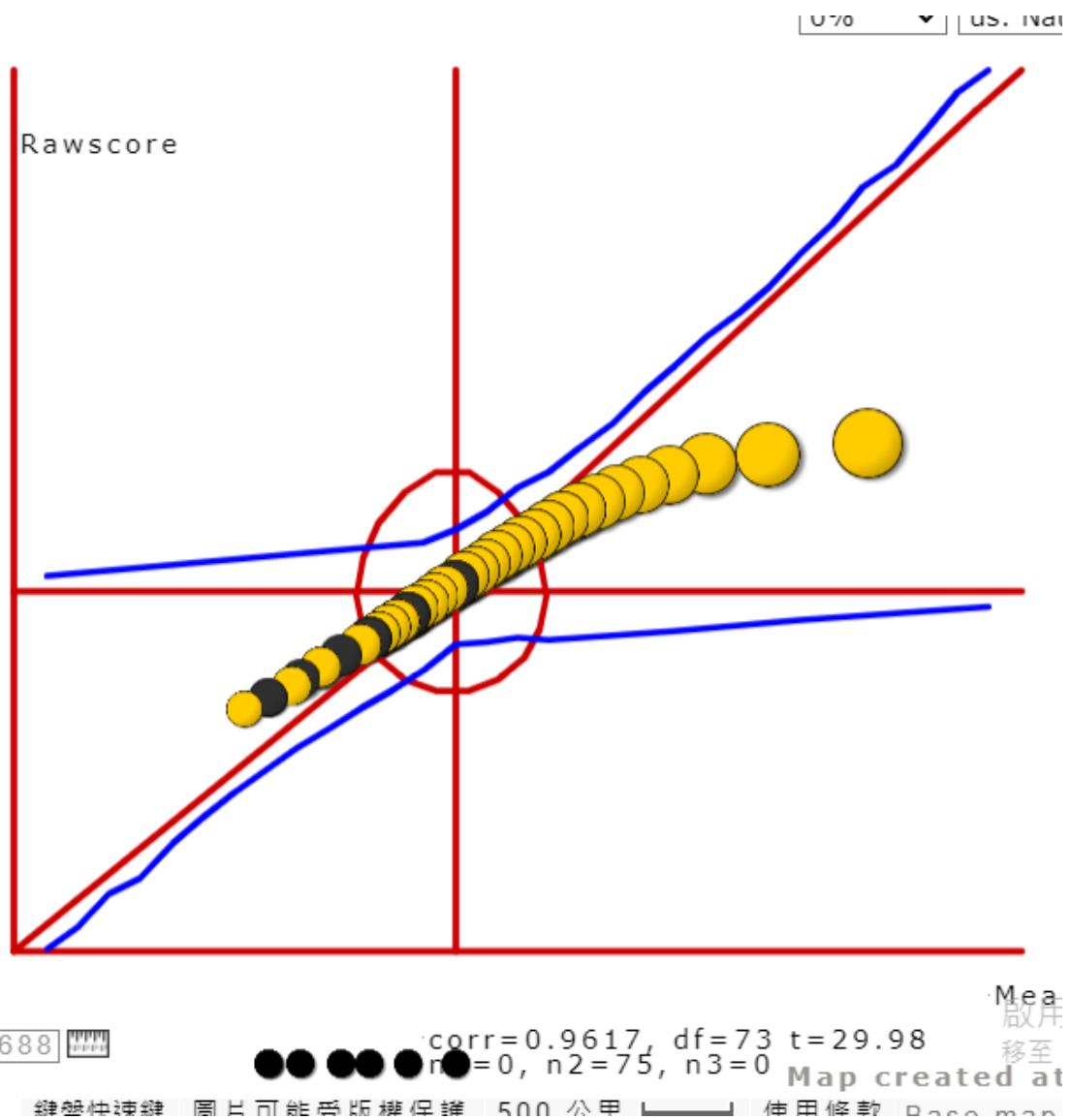
啟用 Windows
移至 [設定] 以啟用 Windows。

540

Person	RAW_SCOUNTMEAS.	SE	Infit	Outfit
MEAN	31.7	25	0.97	0.41
S.D.	8.62	0	1.35	0.19
MAX.	50	25	16.58	1.84
MIN.	12	25	-1.62	0.34
REAL RMSE	0.47	ADJ.SD1.17	SEPARATION2.48	PersonRELIAB.0.86
MODEL RMSE	0.48	ADJ.SD1.27	SEPERATION2.85	PersonRELIAB.0.89
Cronbach's alpha=	0.98	Step delta=		
	-0.86	0.86		

Item	RAW_SCOUNTMEAS.	SE	Infit	Outfit
MEAN	94.96	75	0	0.23
S.D.	30.93	0	1.41	0.06
MAX.	145	75	2.43	0.47
MIN.	37	75	-3.16	0.19
REAL RMSE	0.26	ADJ.SD1.39	SEPARATION5.33	ItemRELIAB.0.97
MODEL RMSE	0.48	ADJ.SD1.39	SEPERATION5.67	ItemRELIAB.0.97

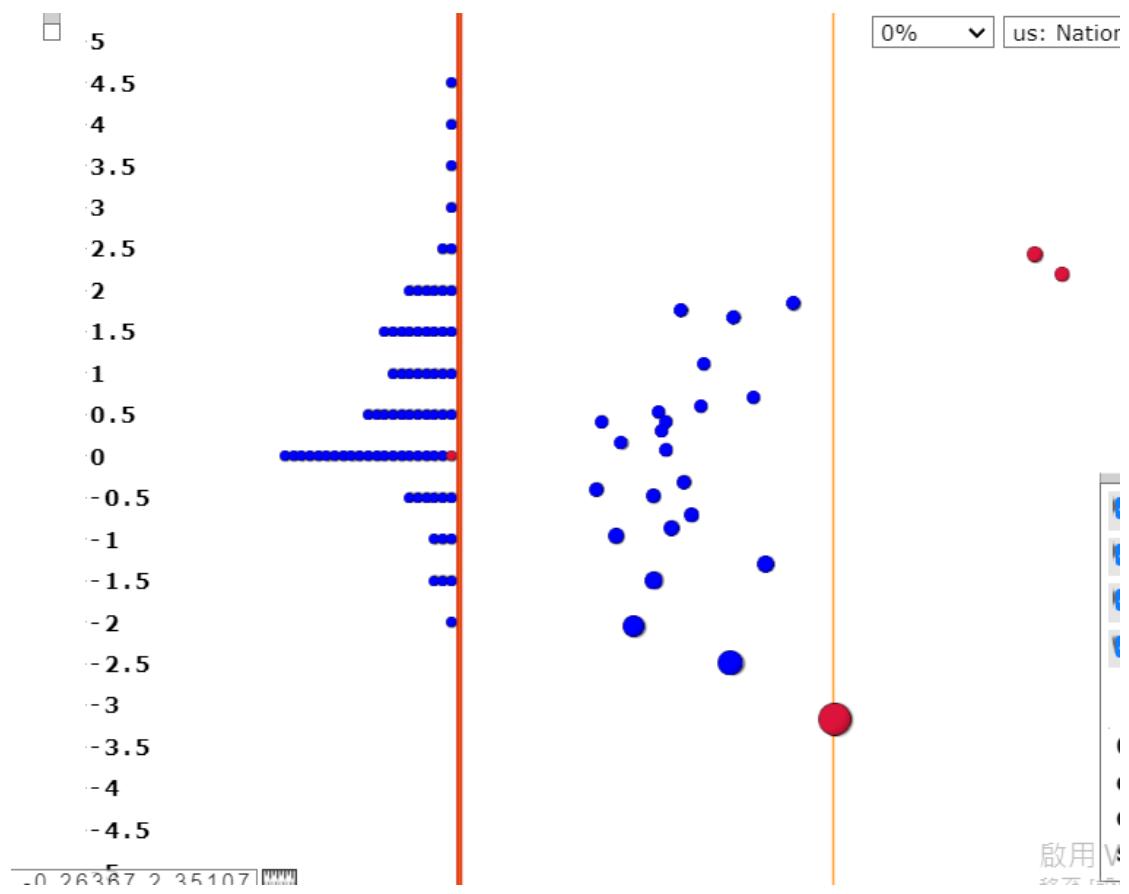
541



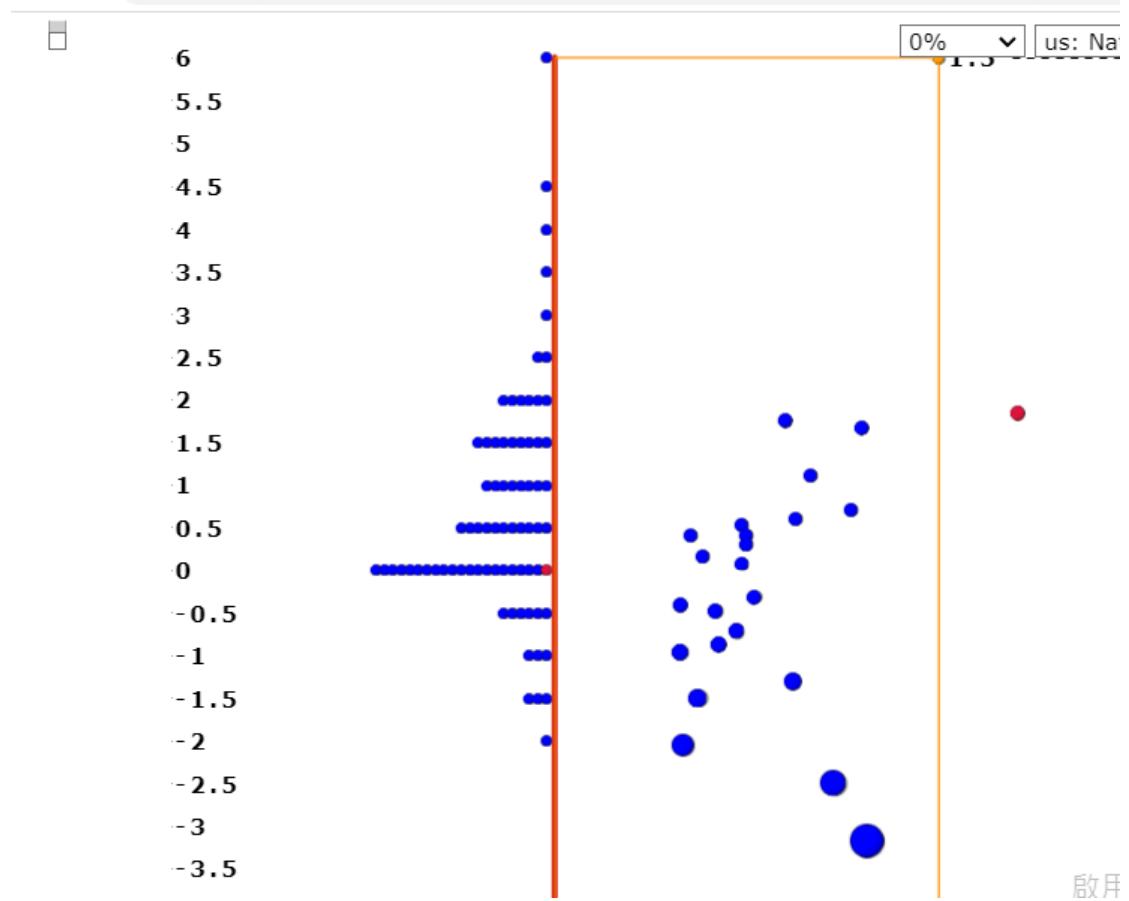
543 Black bubbles means persons with higher Outfit

544 MNSQ

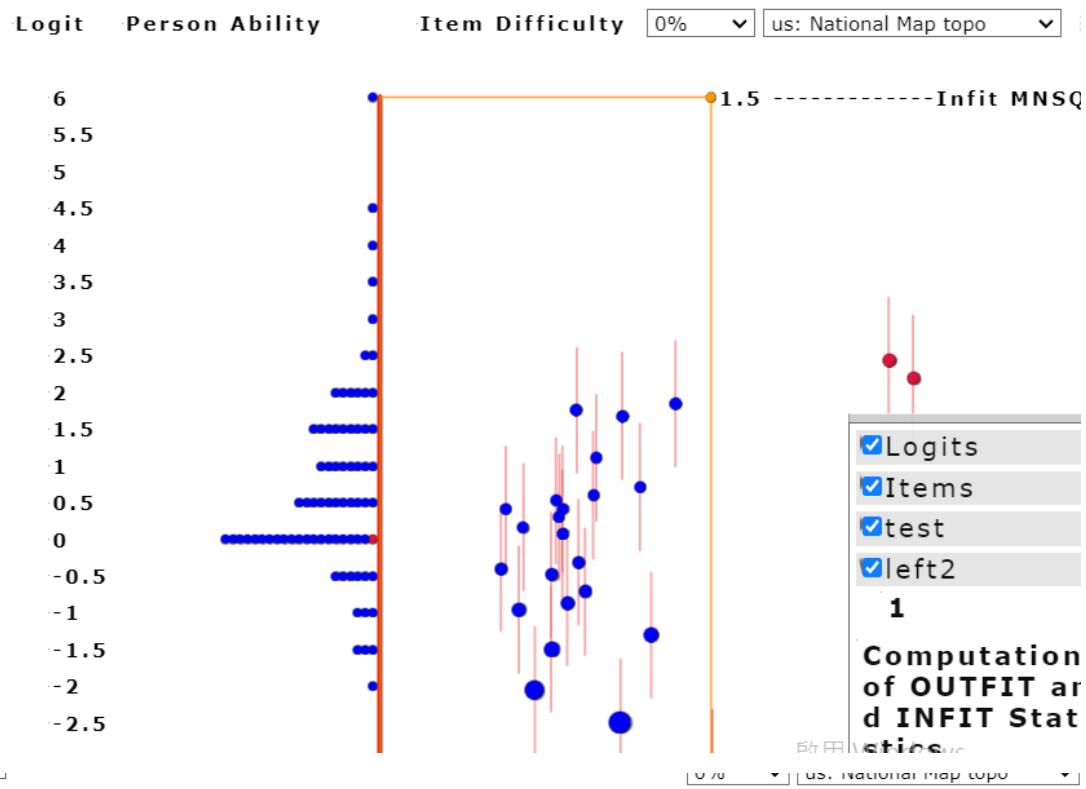
545



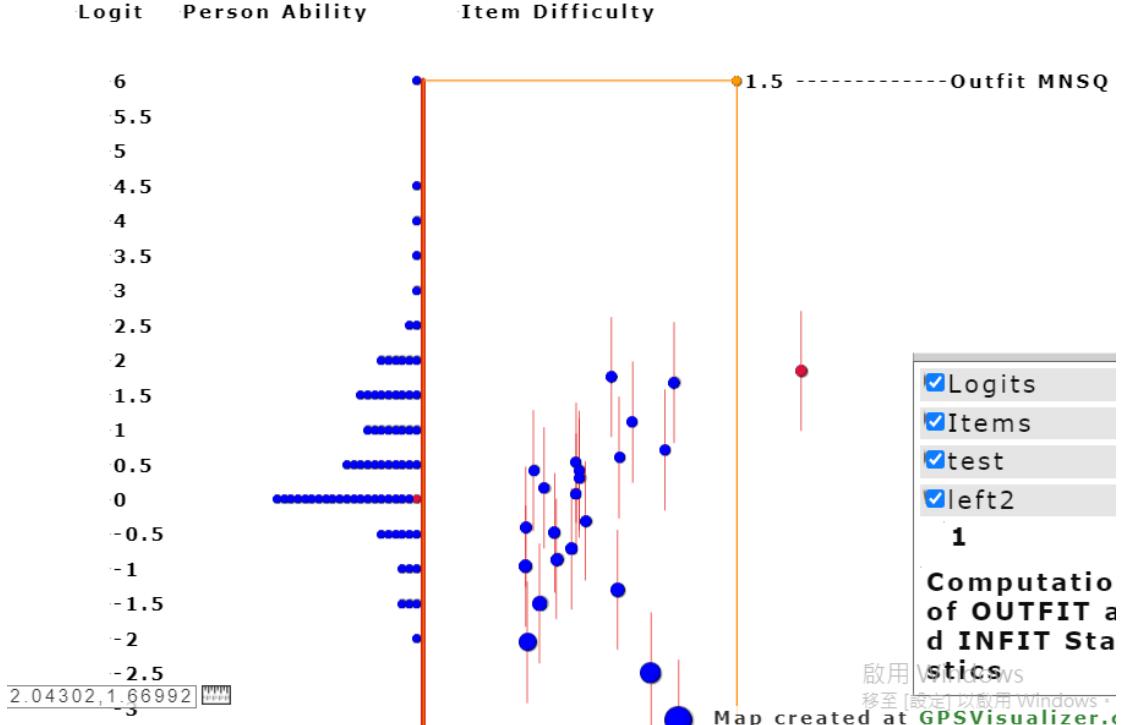
546

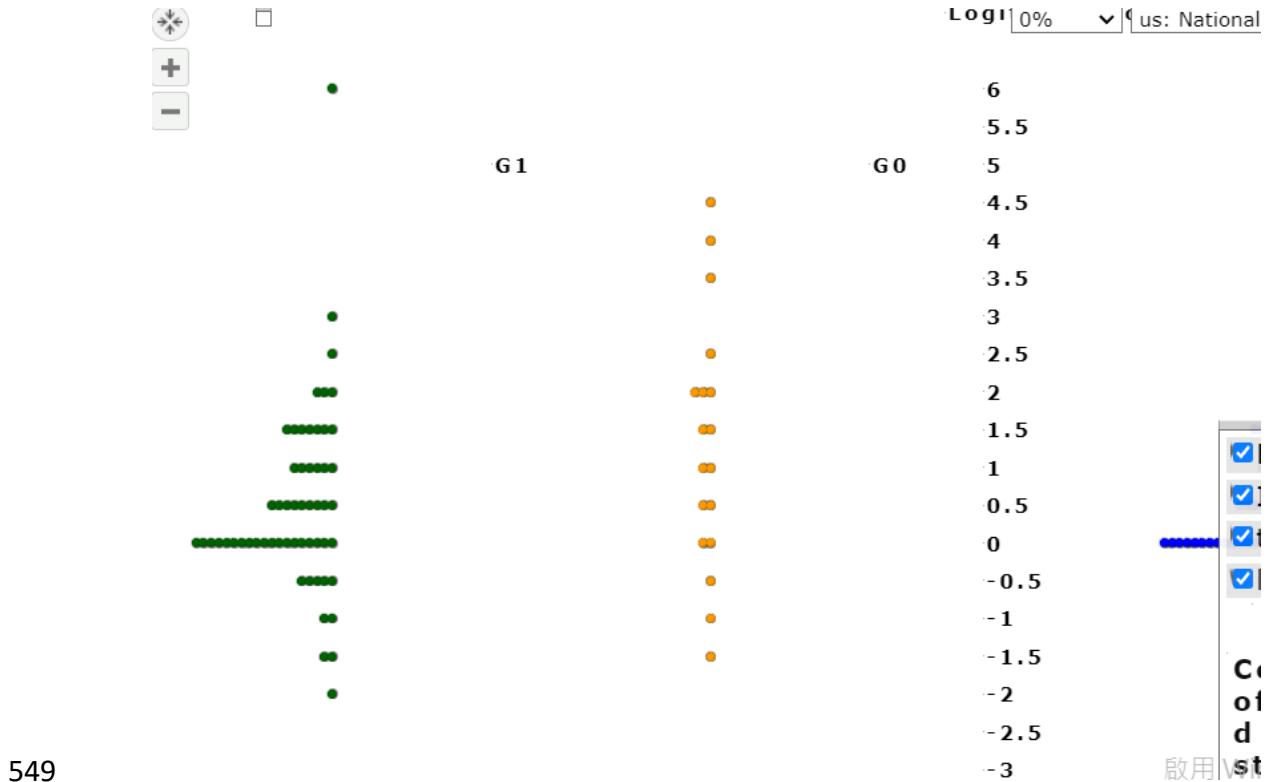


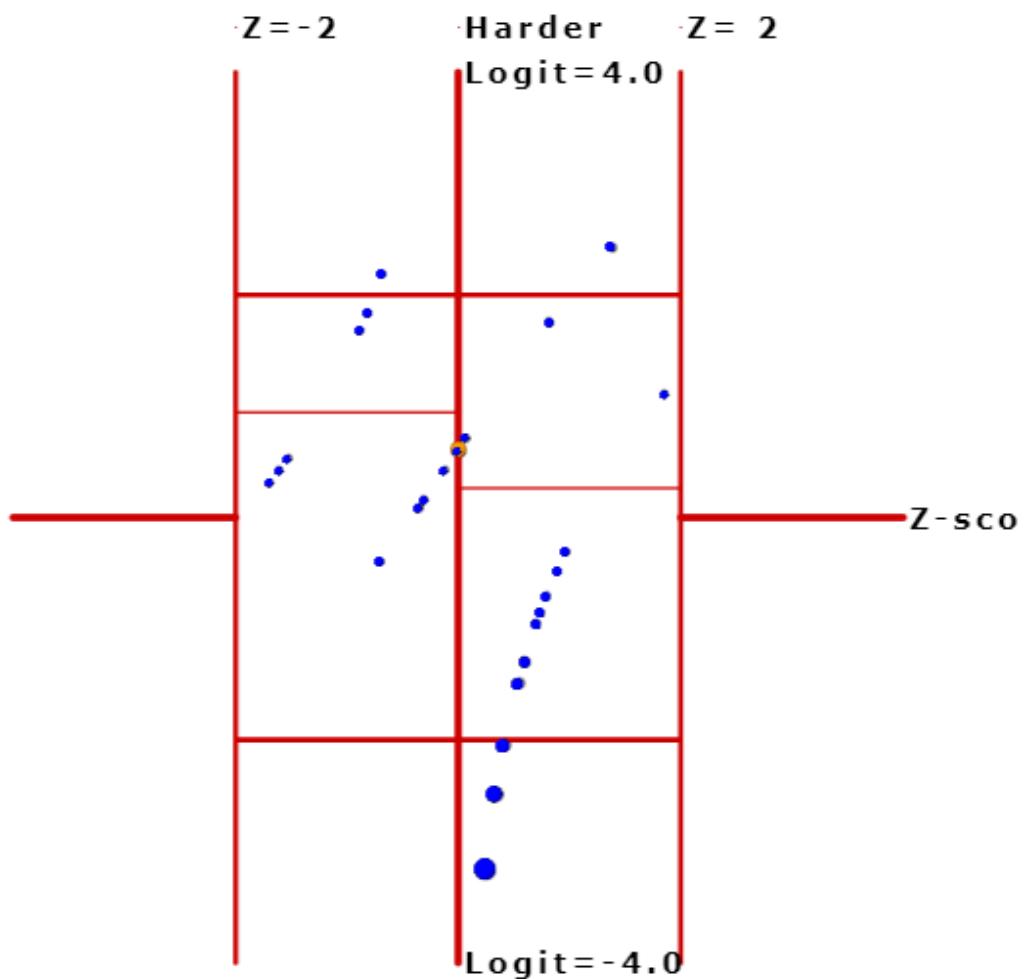
547



548





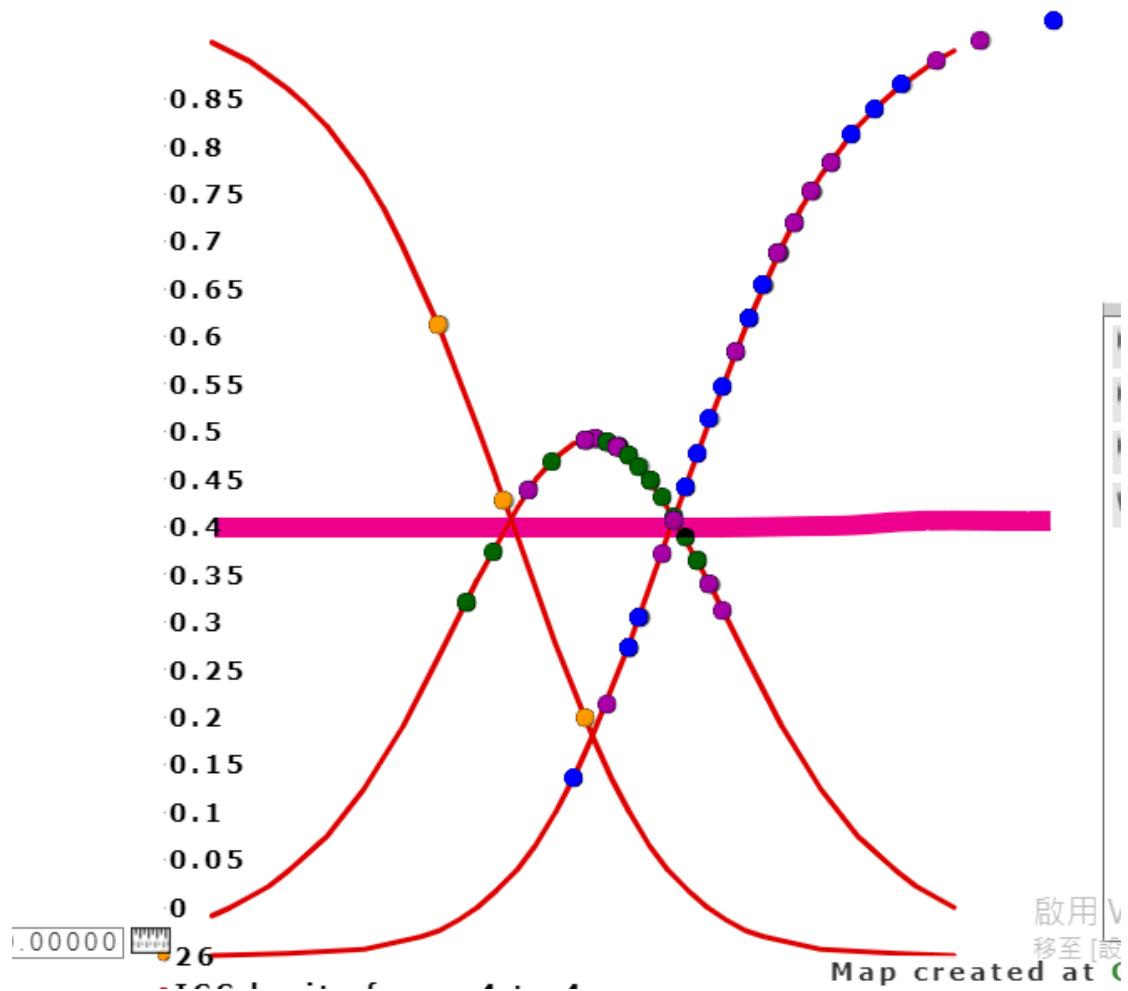


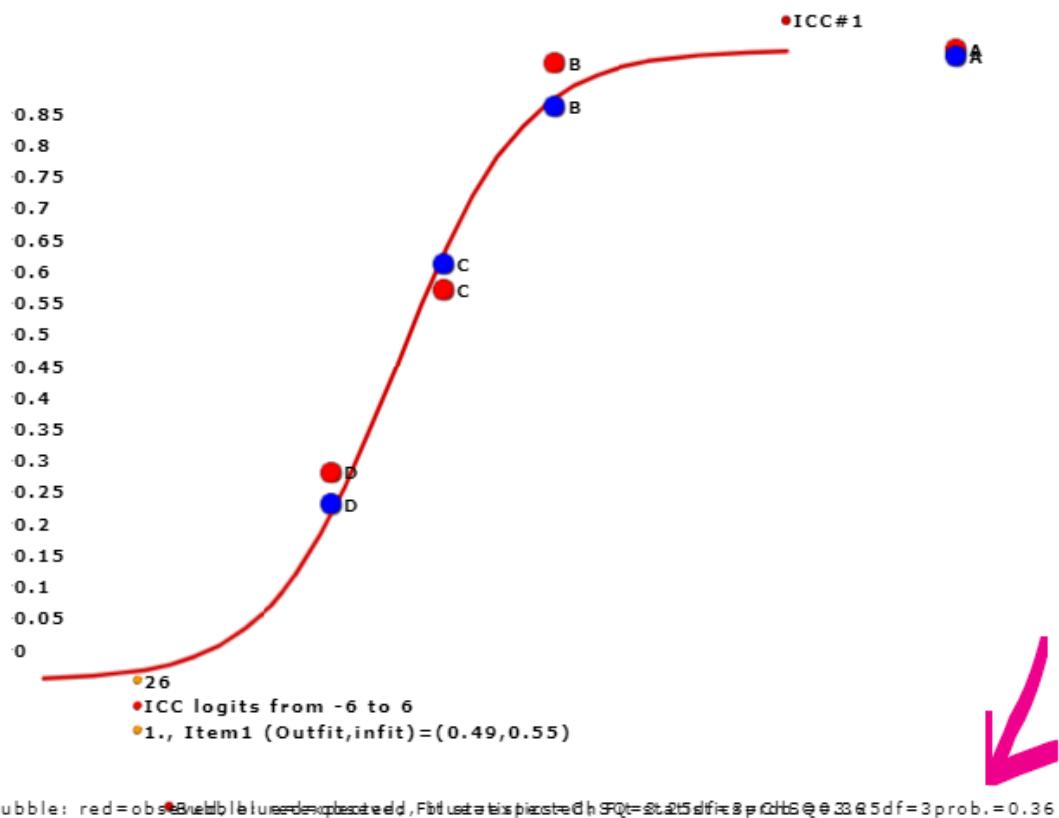
550 326 | ■■■■

551

552 Rating Scale Model in visualizations (10th week)

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Visual displays

KIDMAP person#

Bubble Size

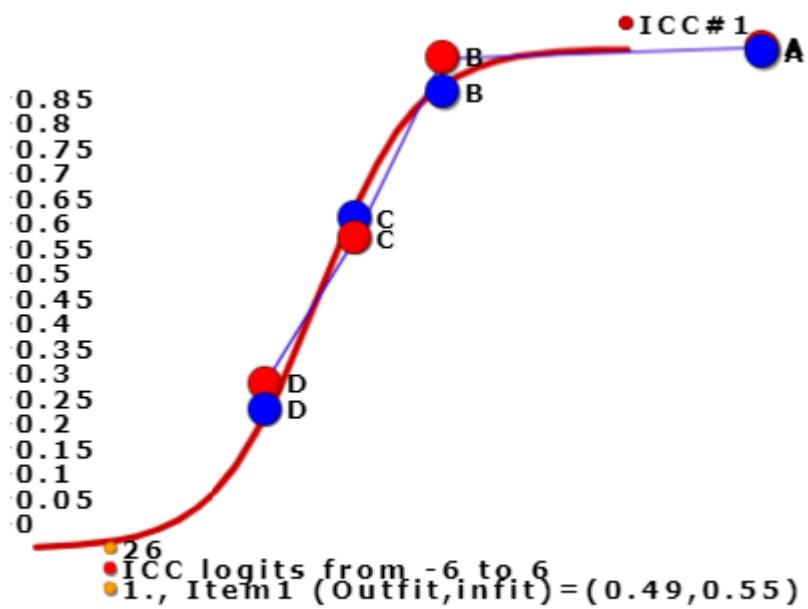
WrightMap(or ICC) dotted with dashes

Fit Types

ICC Item#

Group#

555



red=obs.; blue=expected; ChSQ=3.25 df=3 prob.=0.36

556

Strata item = All items					
Strata	Sum	(n*k)	Mean	Expected	Variance
C_1	1333	1200	1.11	1332.99	401.96
A_2	147	75	1.96	147	2.7
B_3	854	525	1.63	853.98	119.58
D_4	40	75	0.53	40	20.72
ChSQ=	47.59	df= 75	prob.=	0.99	

Ref. in Eq 4(click)

Strata_raw score item=1

Strata	Sumn	Mean	Expected	Variance
C_1	60	48	1.25	63.29
A_2	6	3	2	5.96
B_3	41	21	1.95	38.06
D_4	2	3	0.67	1.68
ChSQ=	3.25	df= 3	prob.=	0.36

Ref. in Eq 4(click)



557

558

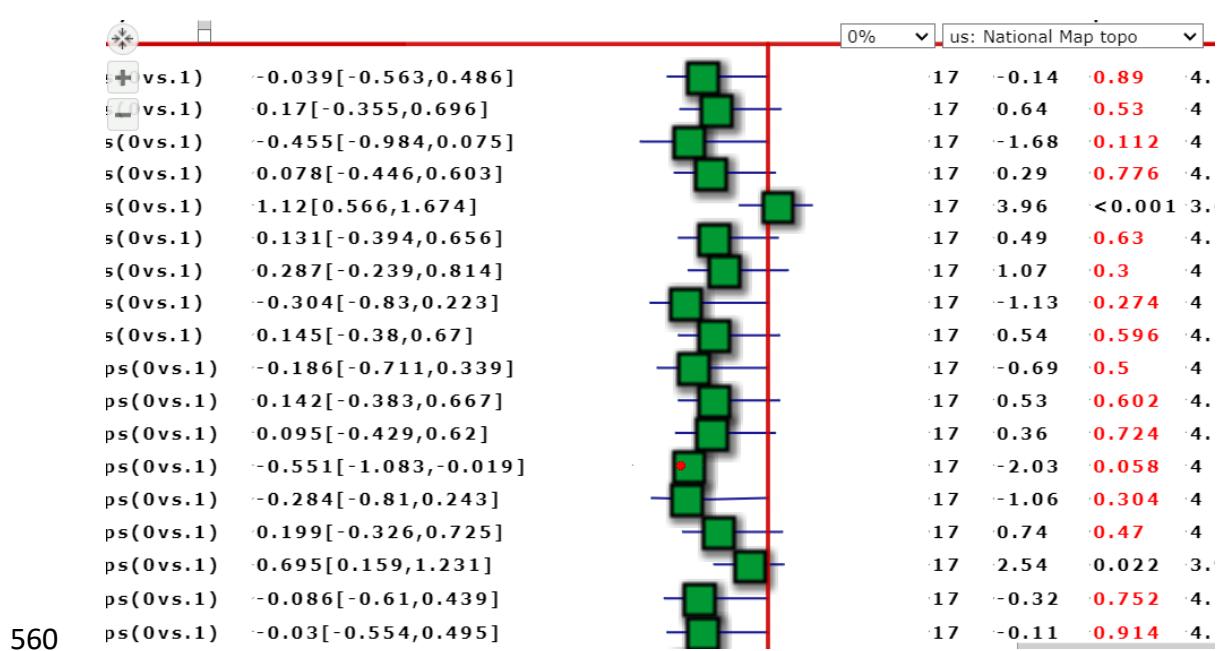
1	57	1.23	1.23	0.08	0	0.11	-0.0	0.2	-0.1	0.89	17
0	18	0.56	0.54	2.19	0.01	4	-1.8	0.5	-3.4	0.00	17
1	57	0.56	0.56	2.19	0	2.1	0.08	0.2	0.34	0.00	17
0	18	1.72	1.72	-0.31	0	-1.17	0.85	0.6	1.4	0.18	17
1	57	1.33	1.33	-0.31	0	-0.21	-0.1	0.2	-0.4	0.00	17
0	18	1.39	1.38	0.53	0.01	0.56	-0.0	0.4	-0.0	0.95	17
1	57	1.05	1.05	0.53	0	0.62	-0.0	0.2	-0.4	0.89	17

DIF class/group specification is: Chi-square-DIF=0,1

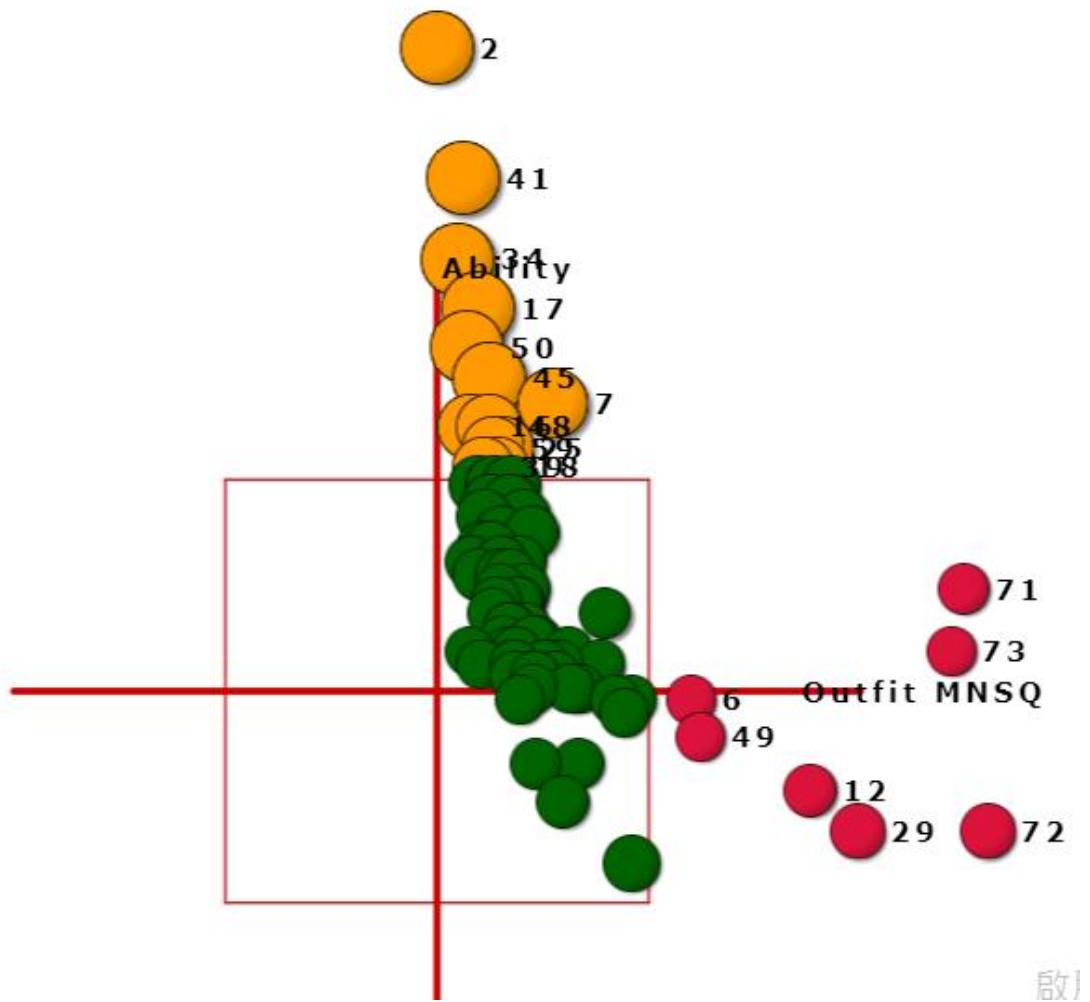
CLASSES	CHI-SQUARE	DIF			Item
		D.F.	sig.	No.	
2	0.03	1	1	1	1
2	0.09	1	0.7522	2	
2	1.05	1	0.3173	3	
2	0.11	1	0.7524	4	
2	1.88	1	0.1685	5	

559

啟用 Windows

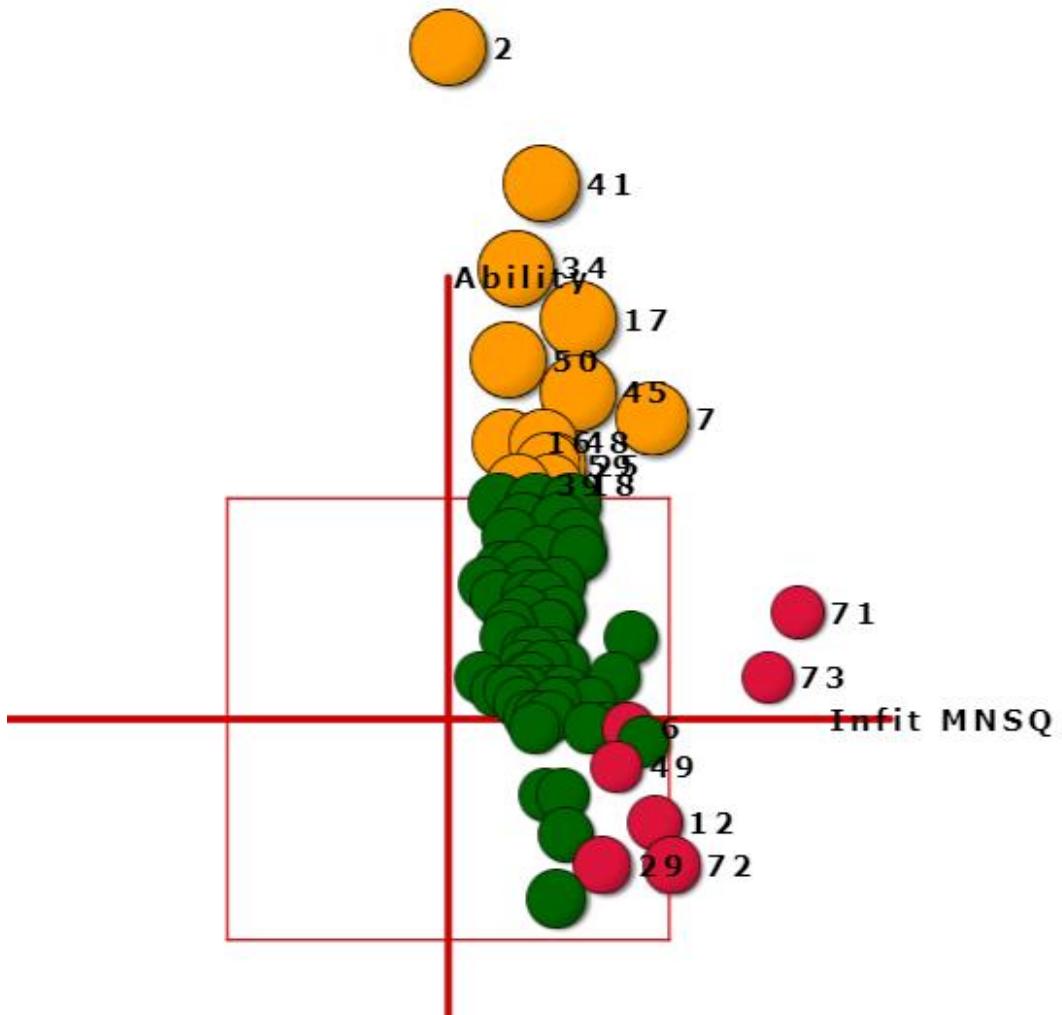


560



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562

Simulation data generated

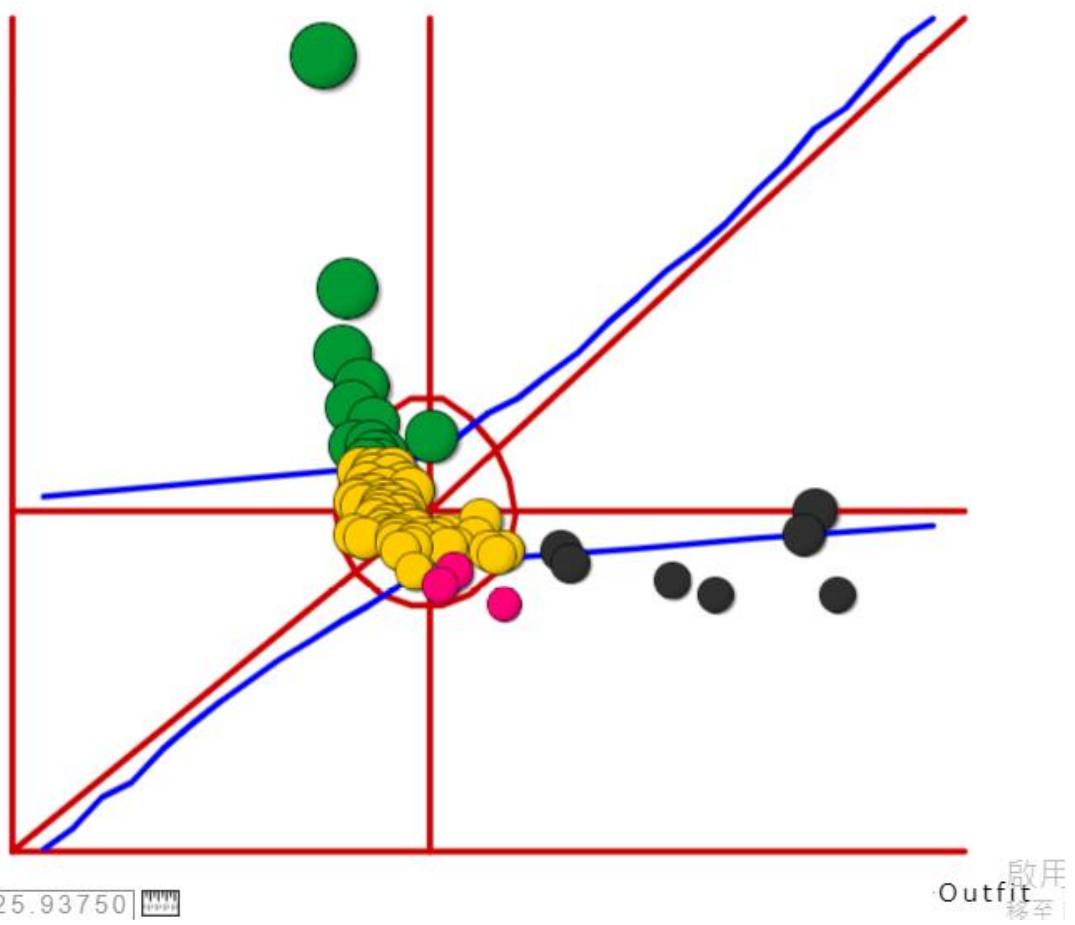
Watch birds, Read books on animals, Read books on plants, Watch grass change, Find ottles and cans, Look up strange animal or plant, Watch animal move, Look in sidewalk cracks, Learn weed names, Listen to bird sing, Find where animal lives, Go to museum, row garden, Look at pictures of plants, Read animal stories, Make a map, Watch what imals eat, Go on picnic, Go to zoo, Watch bugs, Watch bird make nest, Find out what mals eat, Watch a rat, Find out what flowers live on, Talk w/friends about plants, nam roup

1,1,0,0,0,0,1,1,1,2,2,1,2,2,2,0,2,1,0,1,1,Marc Daniel,1
 2,Lawrence F.,1
 2,2,1,0,1,1,0,1,1,2,2,2,2,0,2,1,1,2,2,1,2,2,0,2,1,Toby G.,1
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 2,2,1,1,0,1,1,0,1,1,2,2,1,2,2,1,0,2,2,0,1,1,0,1,0,Matthew,1

563

1874						
ANOVA	Virable	SS	df	MSS	F	p
	Between	9.1	1	9.1	3.62	=FDIST(3.62,1,73)
	Within	183.3	73	2.51		p-value(Click on Me)
	TSS	192.39	74	All mean=	1.27	

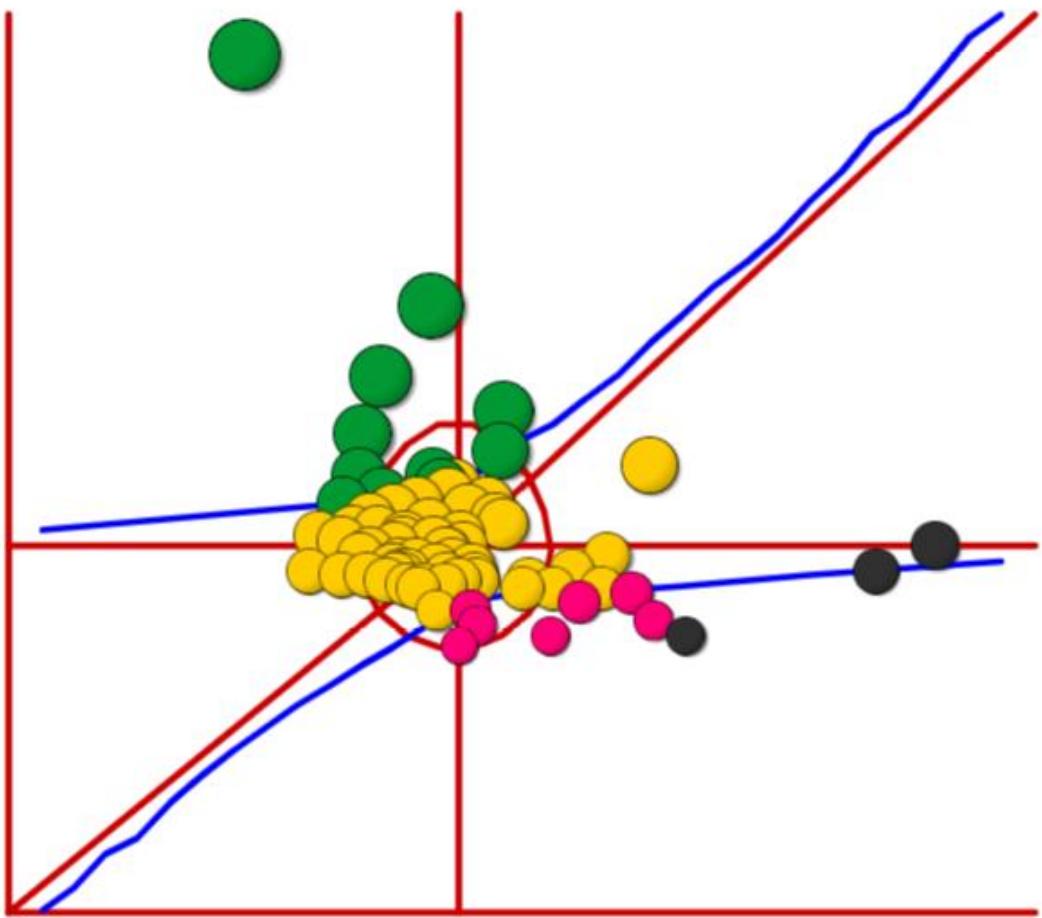
564



565

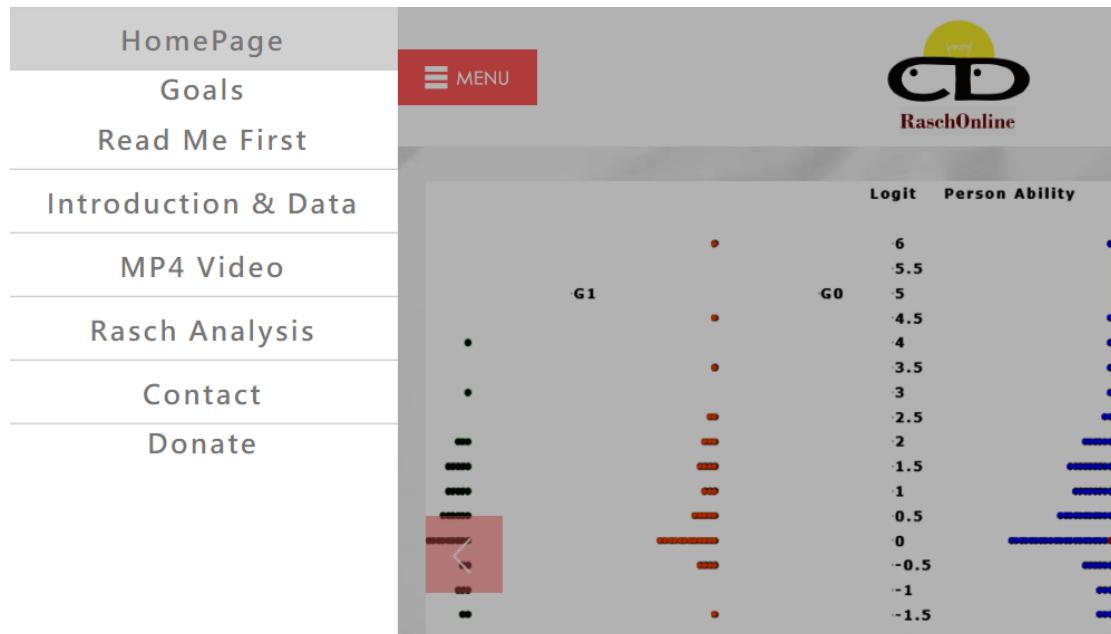
0,25.93750 |

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567

Clear
Go to Manu
Resume

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears

Visual displays Simulation

 KIDMAP person# 1

 Bubble Size 3

 Fit Types Outfit MNSQ

 Wright move to left 0

 ICC Item# 1

 Group# 1

568

569 To simulate data

Simulation data generated

Watch birds,Read books on animals,Read books on plants,Watch grass change,Find bottles
 d cans,Look up strange animal or plant,Watch animal move,Look in sidewalk cracks,Learn w
 d names,Listen to bird sing,Find where animal lives,Go to museum,Grow garden,Look at pic
 res of plants,Read animal stories,Make a map,Watch what animals eat,Go on picnic,Go to zo
 Watch bugs,Watch bird make nest,Find out what animals eat,Watch a rat,Find out what flow
 s live on,Talk w/friends about plants,name,group

```

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```

570

571 Copy and paste onto the entry box

the last two)

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```

[Clear](#) [Go to Manu](#) [Resume](#)

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears.

Visual displays [Simulation](#)

KIDMAP person#

Bubble Size

[Submit](#)

啟用 Win
移至 [設定]

Fit Types [Outfit MNSQ](#)

[Clear](#) [Go to Manu](#) [Resume](#)

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears.

Visual displays [Overall Fit](#)

KIDMAP person#

Bubble Size

[Submit](#)

Fit Types [Outfit MNSQ](#)

Wright move to left

ICC Item#

Group# [1](#)

572

573

iteration...
26

Strata item= All items

Strata	Sum	(n*k)	Mean	Expected	Variance
B_1	1175	750	1.57	1174.98	176.87
A_2	241	125	1.93	241	7.67
C_3	959	925	1.04	959	298.81
D_4	42	75	0.56	42	20.59
ChSQ=	34.92	df=	75	prob.=	1

Ref. in Eq 4(click) 

Strata_raw score item=1 

Strata	Sumn	Mean	Expected	Variance	
B_1	55	30	1.83	53.68	5.29
A_2	10	5	2	9.9	0.1
C_3	46	37	1.24	46.55	14.65
D_4	1	3	0.33	1.86	1.15
ChSQ=	1.1	df=	3	prob.=	0.78

Ref. in Eq 4(click)

574

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears.

Visual displays

KIDMAP person#

Bubble Size

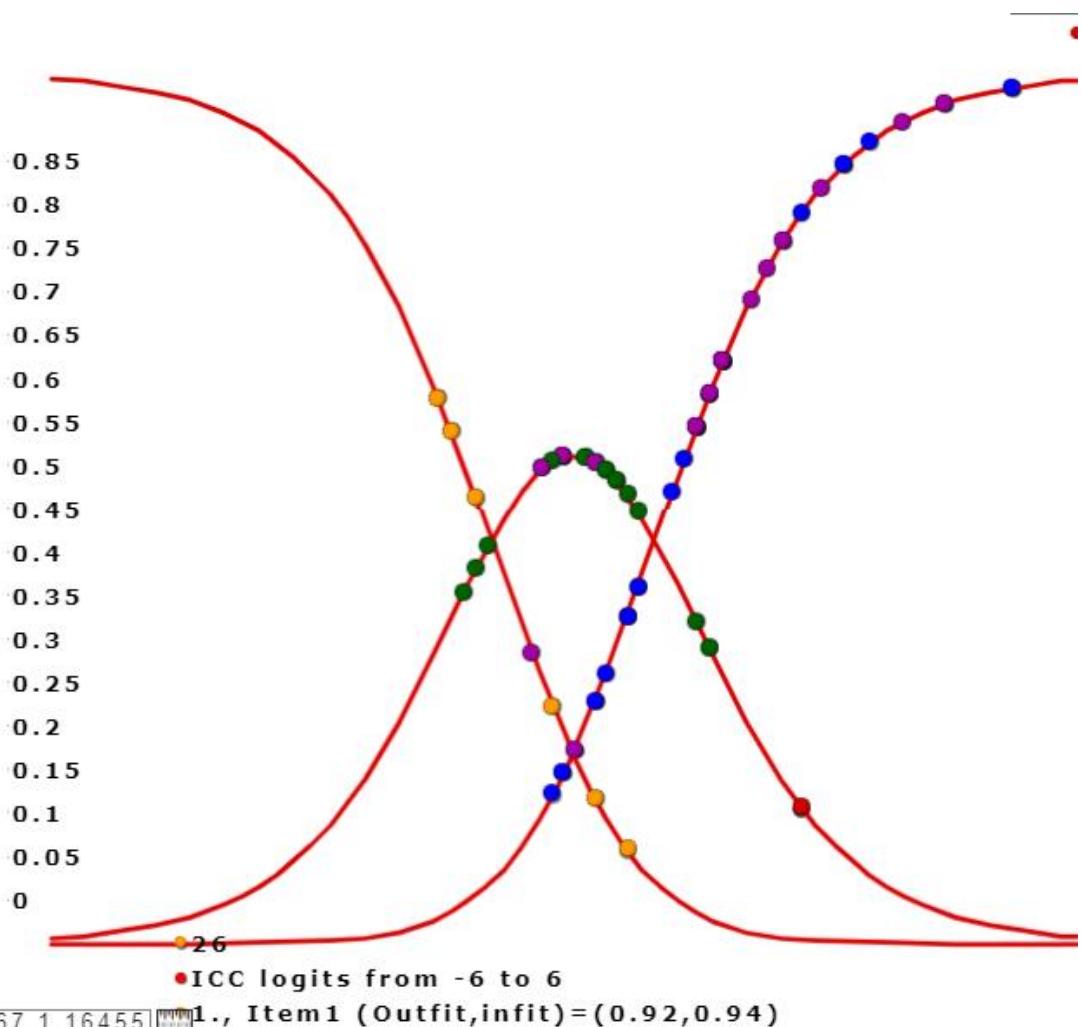
Fit Types

Wright move to left

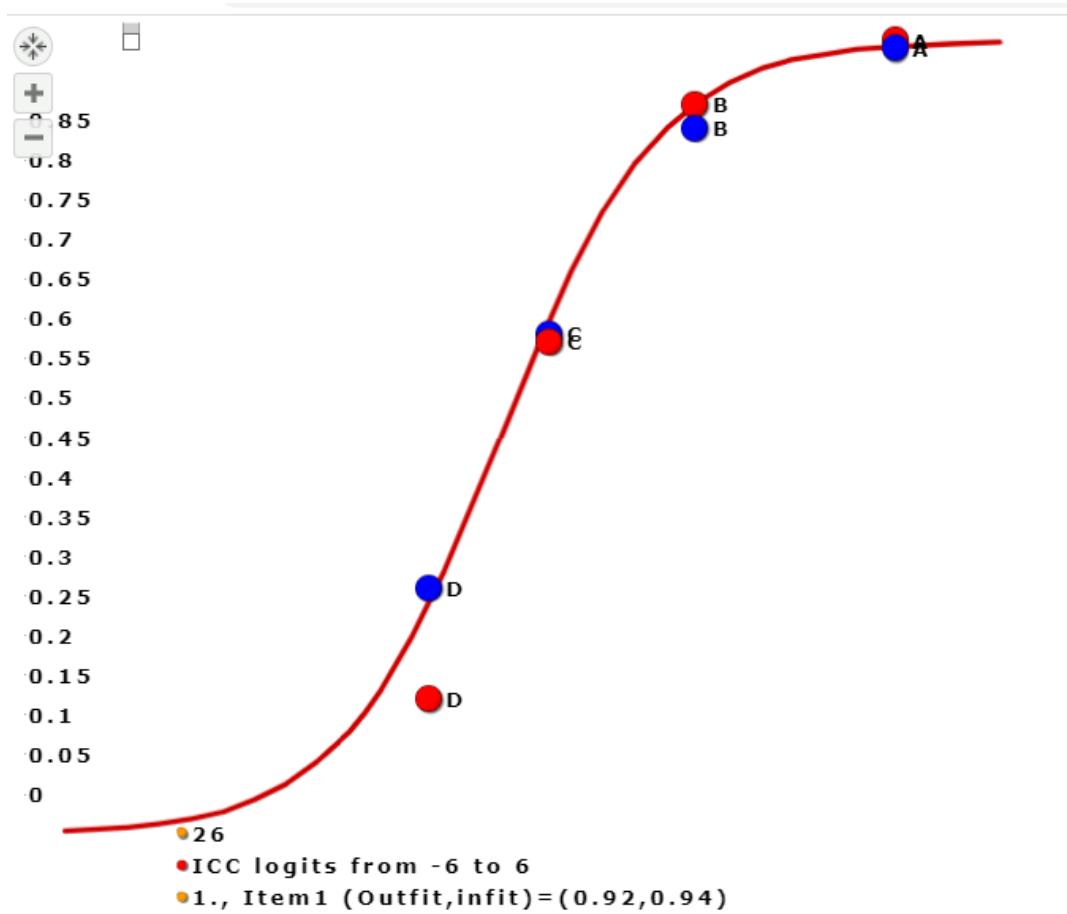
ICC Item#

Group#

575



577



578

Center: -1.16447, -16.66459

Visual displays

KIDMAP person#

Bubble Size

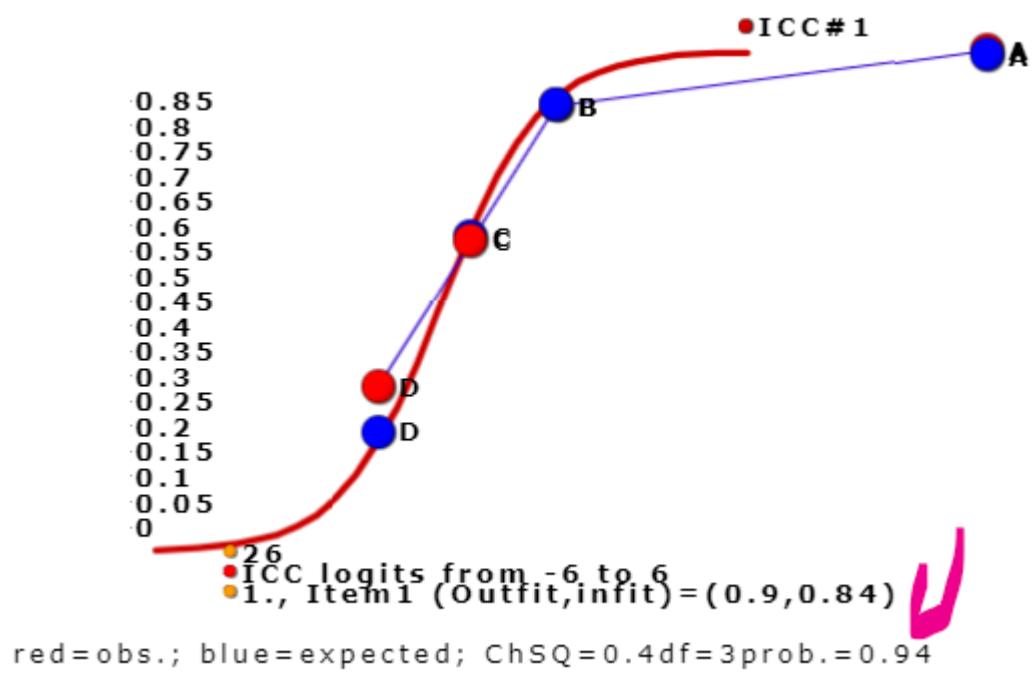
WrightMap(or ICC) dotted with dashes

Fit Types

ICC Item#

Group#

579



580

581

73.2.02148

F.,1
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1,1,1,0,0,1,0,1,1,2,2,1,2,1,1,1,0,2,2,0,2,2,0,1,1,Michael

Clear **Go to Manu** **Resume**

Copy data and Paste them onto the box from Spread sheet
 Click on the submit bottom, the Result immediately appears.

Visual displays **Wright Map**

KIDMAP person# **1**

Bubble Size **3**

Submit

WrightMap dotted with dashes **Yes**

Fit Types **Infit MNSQ**

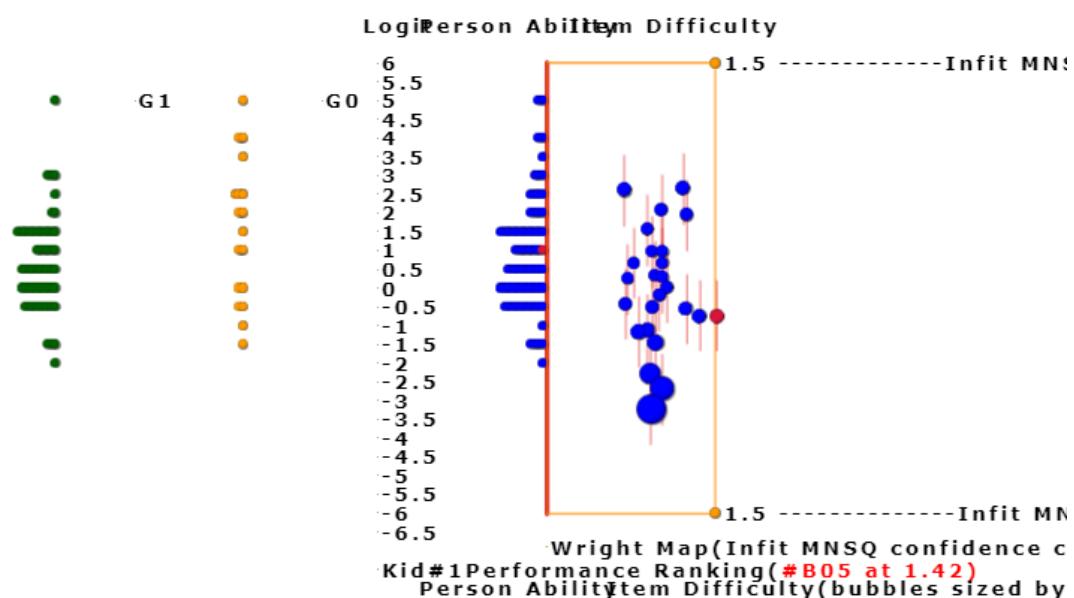
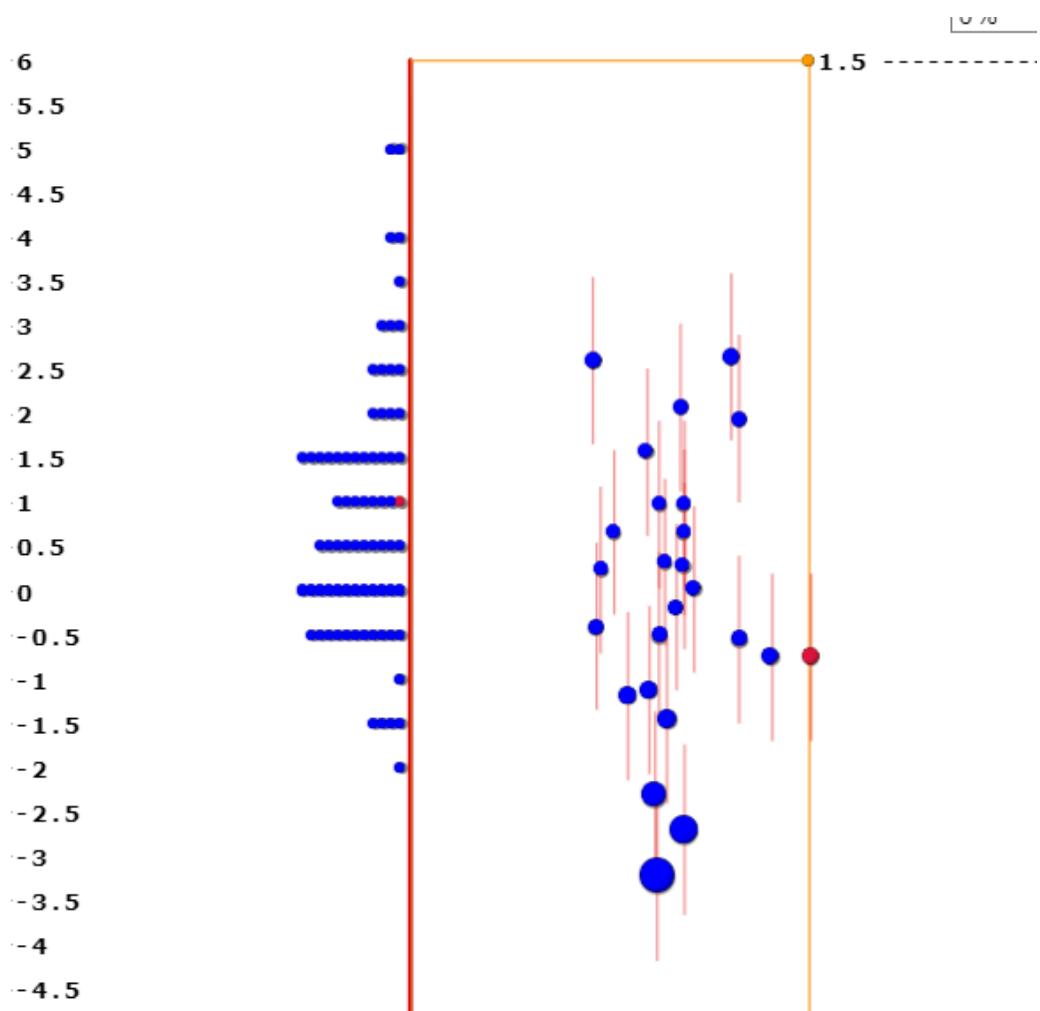
Wright move to left **0**

ICC Item# **1**

Group# **1**

582

583



584

ANOVA	Virable	SS	df	MSS	F	
	Between	12.84	1	12.84	6.54	
	Within	143.32	73	1.96		
585	TSS	156.16	74		All mean=	p =FDIST(6.54,1,73) p-value(Click on Me) 1.29

Fratio value:

DF- numerator:

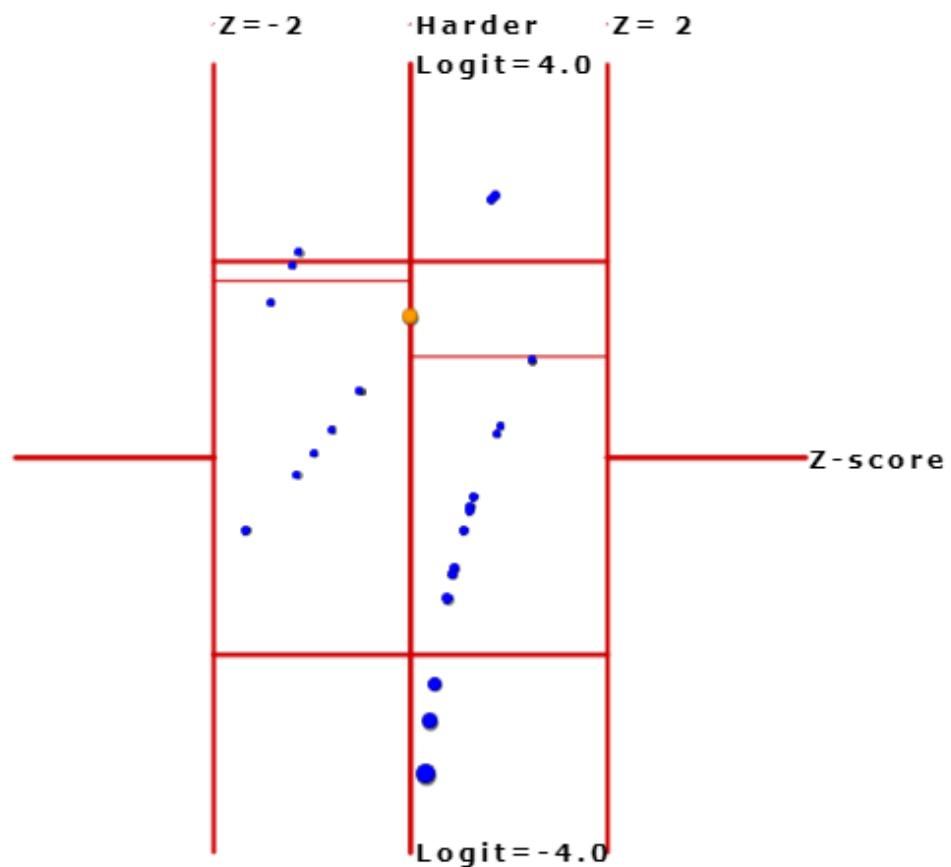
DF- denominator:

Significance Level:

- .01
- .05
- .10

The p-value is .012624. The result is significant at $p < .05$.

586



587

Copy data and Paste them onto the box from Spread st
 Click on the submit bottom, the Result immediately app

Visual displays

KIDMAP person#

Bubble Size

WrightMap dotted with dashes

Fit Types

Wright move to left

ICC Item#

Group#

588

Strata	Sum	(n*k)	Mean	Expected	Variance
B_1	1175	750	1.57	1174.98	176.87
A_2	241	125	1.93	241	7.67
C_3	959	925	1.04	959	298.81
D_4	42	75	0.56	42	20.59
ChSQ=	34.92	df=	75	prob.=	1

Ref. in Eq 4(click)

Strata	Sum	n	Mean	Expected	Variance
B_1	55	30	1.83	53.68	5.29
A_2	10	5	2	9.9	0.1
C_3	46	37	1.24	46.55	14.65
D_4	1	3	0.33	1.86	1.15
ChSQ=	1.1	df=	3	prob.=	0.78

589

Clear **Go to Manu** **Resume**

Copy data and Paste them onto the box from Spread sheet
Click on the submit bottom, the Result immediately appears

Visual displays **Summary**

KIDMAP person# **1**

Bubble Size **3**

Submit

WrightMap dotted with dashes **Yes**

Fit Types **Infit MNSQ**

Wright move to left **0**

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ICC Item# **1**

590

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=====
=====
      Person      RAW_SCOUNTMEAS.      SE      Infit      Outfit
  MEAN        32.2    25    1.09    0.41    0.99    1
  S.D.        9.06     0    1.45    0.14    0.29    0.44
  MAX.        49     25    5.06    1.04    1.76    2.5
  MIN.        13     25   -1.55    0.35    0.41    0.2
  REAL RMSE    0.46  ADJ.SD1.25  SEPARATION2.72PersonRELIAB.0.88
  MODEL RMSE    0.49  ADJ.SD1.38  SEPERATION3.16PersonRELIAB.0.91
  Cronbach's alpha=0.98          Step delta=
                               -0.94    0.94
=====
=====
      Item      RAW_SCOUNTMEAS.SE      Infit      Outfit
  MEAN        96.68   75     0    0.24    1      1
  S.D.        31.05   0     1.51    0.05    0.18    0.32
  MAX.        145    75    2.66    0.47    1.51    2.3
  MIN.        37     75   -3.22    0.2     0.69    0.6
  REAL RMSE    0.25  ADJ.SD1.49  SEPARATION5.97ItemRELIAB.0.97
  MODEL RMSE0.49  ADJ.SD1.49  SEPERATION6.1 ItemRELIAB.0.97
  請用 Windows
  移至 [設定] 以啟用 Windows
591 =====
```

591

592

593 K. How to estimate parameters in RSM model

```
594      redim expect(personno,itemno),Var(personno,itemno),
595      Zscore(personno,itemno),residual(personno,itemno),kurtosis(personno,itemno),kurtosis2(personn
596      o,itemno)
597
598
599      redim item_error(itemno),item_var(itemno)
600
601      iterat=request("iterat")
602      if iterat="" then iterat=40
603
```

```

604      extremeshiftp=0: extremeshiftj=0
605      for iteration=1 to iterat
606          zscore_mean=0 :zscore_sd=0
607          For CATa = 0 To categoryabc 'maxcat - mincat
608              catexp(CATa)=0
609              Next
610
611          redim item_var(itemno)
612          redim item_error(itemno)
613          resi_a=0: resi_b=0
614          sumsqerror=0
615          redim var_p(personno), person_exp(personno)
616          for jk=1 to personno
617              person_error=0:person_max=-100: person_min=100
618              sqaure_resi=0
619
620          perfect_i=0:perfect_p=0
621
622
623          for j=1 to itemno
624
625          If IsNumeric(test(jk,j)) = True Then
626
627              logit = person(jk) -item(j)
628
629              normalizer = 0 ' this will force the sum of the probabilities = 1.0
630
631              sumsqu = 0
632              currentlogit = 0: all_asum = 0
633              ReDim expaaa(maxcat - mincat+1)
634              catcalibrate(0)=0
635              For CATa = 0 To categoryabc 'maxcat - mincat
636                  msum_tau = 0
637                  if category_number>2 then
638                      For jk2 = 0 To CATa
639                          msum_tau = msum_tau + catcalibrate(jk2)
640                      Next
641                  end if

```

```

642         expaaa(CATa) = Exp(CATa * logit - msum_tau)
643         all_asum = all_asum +  expaaa(CATa)
644         Next
645
646         exp_a = 0: kurtosisZ = 0
647         For CATa = 0 To maxcat - mincat
648             exp_a = exp_a + CATa * expaaa(CATa) / all_asum
649         Next
650
651         var_a = 0
652         For CATa = 0 To maxcat - mincat
653             kurtosisZ = kurtosisZ + (exp_a - CATa) ^ 4 * expaaa(CATa) / all_asum
654             var_a = var_a + (exp_a - CATa) ^ 2 * expaaa(CATa) / all_asum
655             catexp(CATa) = catexp(CATa) + expaaa(CATa) / all_asum
656
657         Next
658
659         EXPECT(jk, j) = exp_a
660         var(jk, j) = var_a
661
662         residual(jk, j) = test(jk,j) - exp_a
663         person_error=person_error+residual(jk,j)
664         var_p(jk)=var_p(jk)+var_a
665
666
667         item_var(j)=item_var(j)+var_a
668
669         item_error(j)=item_error(j)+residual(jk,j)
670         if var(jk,j)>0 then
671             Zscore(jk, j) = residual(jk,j)/var(jk,j)^0.5
672             kurtosis(jk, j) = kurtosisZ /Var(jk, j)^2  'outfit
673             kurtosis2(jk, j) = kurtosisZ -Var(jk, j)^2   'infit
674         else
675             Zscore(jk, j) =0
676             kurtosis(jk, j) = 1  'outfit
677             kurtosis2(jk, j) = 1   'infit
678         end if
679         sqaure_resi= sqaure_resi + residual(jk,j)^2

```

```

680         zscore_mean=zscore_mean+ Zscore(jk, j)
681         zscore_sd= zscore_sd+Zscore(jk, j)^2
682
683         if raw_i(J)=personno*maxcat then
684             kurtosis2(jk, j) =0.00001
685             perfect_i=perfect_i+1
686         end if
687         if raw_p(jk)=itemno*maxcat then
688             kurtosis2(jk, j) =0.00001
689             perfect_p=perfect_p+1
690         end if
691
692     else 'missing
693
694
695         var(jk, j)=  "."
696         residual(jk, j)  =  "."
697         Zscore(jk, j)  =  "."
698         kurtosis(jk, j)=  "."
699         kurtosis2(jk, j)=  "."
700
701     end if
702
703     next 'item
704
705
706     if abs(person_error)>sumsqerror then
707         sumsqerror= abs(person_error)
708     end if
709
710     if var_p(jk)<0.0001 then var_p(jk)=0.001
711
712     if var_p(jk)>0 then
713         if person_error/var_p(jk)>10 then
714             person(jk)=10'  6.07
715         elseif person_error/var_p(jk)<-10 then
716             person(jk)=-10 ' -6.07
717         else

```

```

718     person(jk)=person(jk)+  person_error/var_p(jk)
719     if  person(jk)>10 then person(jk)=10
720     if  person(jk)< -10 then person(jk)=-10
721
722     '   response.write "<br>" & round(person(jk),2) & " " & round(person_error,2) & " " &
723     round(var_P(jk),2) & " " & round(person_error/var_p(jk),2) & "===== <br>"
724     end if
725         person_exp(jk)=  sqaure_resi/var_p(jk)  'outfit
726     else
727         person(jk)=person(jk)
728         person_exp(jk)=  1  'outfit
729     end if
730     if person_exp(jk)<.0016 then person_exp(jk)=0.0016
731     if raw_p(jk)=personmax2 then personmax2m=person(jk):pvarmax2m=var_p(jk)
732     if raw_p(jk)=personmin2 then personmin2m=person(jk):pvarmin2m=var_p(jk)
733     if person(jk)=10 or person(jk)=-10 then extremeshiftp=1
734 next 'person
735
736
737     item_avg=0
738     for j=1 to itemno
739     if abs(item_error(j))>sumsqerror then
740         '  sumsqerror= abs(item_error(j))
741
742     end if
743         resi_b=resi_b+ item_error(j)
744
745     if item_var(j)<0.0001 then item_var(j)=0.001
746
747     if item_var(j)>0 then
748         if item_error(j)/item_var(j)>10 then
749             item(j)= 10
750             elseif item_error(j)/item_var(j)<-10 then
751                 item(j)= -10
752             else
753                 item(j)=item(j)- item_error(j)/item_var(j)
754                 if  item(j)> 10 then  item(j)=10
755                 if  item(j)< -10 then  item(j)=-10

```

```

756         end if
757         ' response.write "<br>" & j & " " & round(item_error(j),2) & ":" &
758         round(item_var(j),2)
759
760     else
761         item(j)=item(j)
762     end if
763         item_avg=item_avg+item(j)
764
765     if raw_i(j)=itemmax2 then itemmax2m=item(j):ivarmax2m=item_var(j)
766
767     if raw_i(j)=itemmin2 then itemmin2m=item(j):ivarmin2m=item_var(j)
768
769     if item(j)=10 or item(j)=-10 then extremeshifti=1
770 next
771
772         item_avg= item_avg/itemno
773         for j=1 to itemno
774             item(j)= item(j)-item_avg
775             ' response.write "<br>item" & j & " " & round(item(j),2) & ":" &
776             round(item_avg,2)
777             next
778             cat_avg=0
779
780         For jkm = 0 To category_number - 1 ' mincat
781             'catexp
782             catresi(jkm)= catobs(jkm)-CATEXP(jkm)
783             ' response.write "<br>cat" & round(catobs(jkm),2) & " " & round(CATEXP(jkm),2) &
784             " " & round(catresi(jkm),2) & "<br>"
785
786             if abs(catresi(jkm))>sumsqerror then
787                 sumsqerror= abs(catresi(jkm))
788             end if
789
790             if jkm>0 then
791
792                 if catobs(jkm)>0 and catexp(jkm)>0 then
793                     if catobs(jkm-1)/catobs(jkm)>0 and catexp(jkm-1)>0 then

```

```

794             catthresh(jkm) =catcalibrate(jkm)+Log(catobs(jkm-1)/catobs(jkm)) -
795             LOG(catexp(jkm-1)/catexp(jkm))
796             end if
797             else
798                 catthresh(jkm) =catcalibrate(jkm)
799
800
801             end if
802             cat_avg=cat_avg+catthresh(jkm)
803             else
804                 catthresh(jkm) =0
805             end if
806
807             Next
808
809
810             if (category_number - 1)>0 then
811                 cat_avg= cat_avg/(category_number - 1)
812             else
813                 cat_avg=0.001
814             end if
815
816             catadj(0)=0
817             For jkm = 1 To category_number - 1 ' mincat
818                 catadj(jkm)=catthresh(jkm)-cat_avg
819                 catcalibrate(jkm)=catadj(jkm)
820
821             next
822             if sumsqerror<0.05 or  abs(sumsqerror2 - sumsqerror)<0.01 then
823                 response.write "Residuals=" & round(sumsqerror,2)  & "previous vs. after=" &
824                 round(sumsqerror2,2)
825
826             if sumsqerror2>0 and  sumsqerror>0 and iteration>1 then
827
828                 exit for
829             end if
830             end if
831             sumsqerror2 = sumsqerror

```

```

832     ' response.write "<font color=red>" & iteration & "</font>" & resi_a & " " & resi_b & " "
833     & sumsqerror2 & "<br>"
834         if iteration=24    then
835
836             end if
837
838         next 'iteration

```

839 L. How to deal with extreme scores in responses using 840 the trend prediction for the theta, delta, and variance

```

841             ' for extreme scores
842                 if extremeshiftp=1 then
843                     extremeperson=(personmax2m-personmin2m)/(personmax2-
844                     personmin2)*(maxcat*itemno-personmax2)+personmax2m
845                     extremeperson0=(personmax2m-personmin2m)/(personmax2-personmin2)*(0-
846                     personmin2)+personmin2m
847                     vextremeperson=(personmax2m-personmin2m)/(pvarmax2m-
848                     pvarmin2m)*(extremeperson-personmax2m)+pvarmax2m
849                     vextremeperson0=(personmax2m-personmin2m)/(pvarmax2m-
850                     pvarmin2m)*(extremeperson0-personmin2m)+pvarmin2m2m
851                     for jk=1 to personno
852                         if person(jk)=10  then person(jk)=extremeperson: var_p(jk)=vextremeperson
853                         if person(jk)=-10 then person(jk)=extremeperson0: var_p(jk)=vextremeperson0
854                         if var_p(jk)<=0 then var_p(jk)=0.01
855                     next
856                     end if
857
858                     if extremeshifti=1 then
859                         extremeitem=(itemmax2m-itemmin2m)/(itemmax2-itemmin2)*(maxcat*personno-
860                         itemmax2)+itemmax2m
861                         extremeitem0=(itemmax2m-itemmin2m)/(itemmax2-itemmin2)*(0-
862                         itemmin2)+itemmin2m
863                         vextremeitem=(itemmax2m-itemmin2m)/(itemmax2-itemmin2)*(extremeitem-
864                         itemmax2m)+ivarmax2m
865                         vextremeitem0=(itemmax2m-itemmin2m)/(itemmax2-itemmin2)*(extremeitem0-
866                         itemmin2m)+ivarmin2m
867                         for j=1 to itemno

```

868 if item(j)=10 then item(j)=extremeitem: item_var(j)=vextremeitem
869 if itrm(j)=-10 then item(j)=extremeitem0:item_var(j)=vextremeitem0
870 if item_var(j)<=0 then item_var(j)=0.01
871 next
872 end if

873 '=====end iteration

874

875 **Excises:**

876 What was the economic condition of China before Deng
877 Xiaoping introduced his reforms? What was the economic
878 condition of China after Deng Xiaoping introduced his
879 reforms?

880 Data from

881 https://en.wikipedia.org/wiki/List_of_countries_by_largest_historical_GDP

Bank, and United Nations Index (In USD billions) ¹⁴⁴⁹⁹⁹⁹											
Year	1st High-growth	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
2020	United States 20,200.600	China 14,772.721	Japan 5,004.673	Germany 3,000.000	United Kingdom 2,707.741	India 2,002.964	France 2,000.804	Italy 1,000.445	Canada 1,001.408	South Korea 1,000.525	
2015	United States 16,000.600	China 11,200.100	Japan 4,300.420	Germany 3,000.380	United Kingdom 2,602.304	France 2,400.163	India 2,000.125	Italy 1,000.000	Brazil 1,001.400	Canada 1,000.000	
2010	United States 14,000.400	China 5,012.401	Japan 3,700.425	Germany 3,000.000	France 2,900.003	United Kingdom 2,300.079	Brazil 2,007.009	Italy 2,001.412	India 1,700.010	Russia 1,000.403	
2005	United States 13,000.700	Japan 4,722.900	Germany 3,000.300	United Kingdom 2,511.165	China 2,300.700	France 2,200.450	Italy 1,000.804	Canada 1,000.407	Spain 1,000.207	South Korea 800.107	
2000	United States 10,200.700	Japan 4,007.301	Germany 3,000.073	United Kingdom 1,400.216	France 1,300.904	China 1,200.912	Italy 1,000.109	Canada 700.319	Mexico 600.000	Brazil 600.404	
1995	United States 7,000.000	Japan 5,400.005	Germany 2,500.371	France 1,600.186	United Kingdom 1,200.010	Italy 1,171.510	Brazil 700.479	China 700.070	Spain 612.413	Canada 600.004	
1990	United States 5,000.500	Japan 3,029.240	Soviet Union 1,000.000	West Germany 1,200.270	France 1,200.000	Italy 1,177.003	United Kingdom 1,000.397	Mexico 500.177	Brazil 500.945	Canada 500.000	
1985	United States 4,000.717	Soviet Union 3,100.720	Japan 1,000.000	West Germany 650.761	France 200.040	United Kingdom 500.244	Italy 450.002	Canada 300.771	China 312.016	India 200.619	
1980	United States 2,000.400	Soviet Union 1,000.700	Japan 1,000.000	West Germany 610.000	France 600.130	United Kingdom 500.300	Italy 400.000	Canada 200.000	Brazil 200.024	China 220.000	
1975	United States 1,000.900	Soviet Union 900.300	Japan 500.001	West Germany 470.780	France 200.000	United Kingdom 200.014	Italy 200.000	Canada 170.407	China 100.701	Brazil 110.000	
1970	United States 1,000.900	Soviet Union 500.400	Japan 200.001	West Germany 200.000	France 100.400	United Kingdom 100.000	Italy 100.257	China 90.273	Canada 80.704	India 60.494	
1965	United States 700.000	Soviet Union 200.300	West Germany 120.000	France 100.100	United Kingdom 100.000	Japan 80.000	China 60.709	Italy 60.000	India 50.000	Canada 50.000	
1960	United States 500.000	Soviet Union 140.300	West Germany 80.172	United Kingdom 70.000	France 60.000	China 60.000	Japan 40.000	Canada 40.000	India 30.000	India 30.000	

882

883 Transform table data into contingency table data below:

	B	C	D	E	F	G	H	I	J	K	L
Year	1st highlighter	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
2020	United States	China	Japan	Germany	United Kingdom	India	France	Italy	Canada	South Korea	
2015	United States	China	Japan	Germany	United Kingdom	France	India	Italy	Brazil	Canada	
2010	United States	China	Japan	Germany	France	United Kingdom	Brazil	Italy	India	Russia	
2005	United States	Japan	Germany	United Kingdom	China	France	Italy	Canada	Spain	South Korea	
2000	United States	Japan	Germany	United Kingdom	France	China	Italy	Canada	Mexico	Brazil	
1995	United States	Japan	Germany	France	United Kingdom	Italy	Brazil	China	Spain	Canada	
1990	United States	Japan	Soviet Union	West Germany	France	Italy	United Kingdom	Mexico	Brazil	Canada	
1985	United States	Soviet Union	Japan	West Germany	France	United Kingdom	Italy	Canada	China	India	
1980	United States	Soviet Union	Japan	West Germany	France	United Kingdom	Italy	Canada	Brazil	China	
1975	United States	Soviet Union	Japan	West Germany	France	United Kingdom	Italy	Canada	China	Brazil	
1970	United States	Soviet Union	Japan	West Germany	France	United Kingdom	Italy	China	Canada	India	
1965	United States	Soviet Union	West Germany	France	United Kingdom	Japan	China	Italy	India	Canada	
1960	United States	Soviet Union	West Germany	United Kingdom	France	China	Japan	Canada	Italy	India	

884

885 Transform contingency table data into response format data

886 with RSM (responses from 0 to 9, the higher, the stronger)

887 below:

	2020	2015	2010	2005	2000	1995	1990	1985	1980	1975	1970	1965	1960
18 Brazil		1	3	0	3	1		1	0				
19 Canada	1	0		2	2	0	0	2	2	2	1	0	2
20 China	8	8	8	5	4	2		1	0	1	2	3	4
21 France	3	4	5	4	5	6	5	5	5	5	5	6	5
22 Germany	6	6	6	7	7	7							
23 India	4	3	1					0			0	1	0
24 Italy	2	2	2	3	3	4	4	3	3	3	3	2	1
25 Japan	7	7	7	8	8	8	8	7	7	7	7	4	3
26 Mexico					1		2						
27 Russia			0										
28 South Korea	0			0				7	8	8	8	8	8
29 Soviet Union													
30 Spain				1		1							
31 United Kingdom	5	5	4	6	6	5	3	4	4	4	4	5	6
32 United States	9	9	9	9	9	9	9	9	9	9	9	9	9
33 West Germany							6	6	6	6	6	7	7

888

889 Note. responses are generated by code in MS Excel below:

```

890 Private Sub CommandButton1_Click()
891 For jk = 18 To 33
892     ma = Trim(Cells(jk, 1))
893     For jm = 2 To 14
894         For j = 2 To 11
895             mb = Trim(Cells(jm, j))
896             If ma = mb Then
897                 arank = 10 - (j - 1)
898                 Cells(jk, jm) = arank
899             End If

```

900 Next j
 901 Next jm
 902 Next jk
 903 End Sub

			CommandButton	2020	2015	2010	2005	2000	1995	1990	1985	1980	1975	1970	1965	1960
15																
16																
17																
18	Brazil			0	1	3	0	0	3	1	0	1	0	0	0	0
19	Canada			1	0	0	2	2	0	0	2	2	2	1	0	2
20	China			8	8	8	5	4	2	0	1	0	1	2	3	4
21	France			3	4	5	4	5	6	5	5	5	5	6	5	5
22	Germany			6	6	6	7	7	0	0	0	0	0	0	0	0
23	India			4	3	1	0	0	0	0	0	0	0	0	1	0
24	Italy			2	2	2	3	3	4	4	3	3	3	3	2	1
25	Japan			7	7	7	8	8	8	8	7	7	7	7	4	3
26	Mexico			0	0	0	0	1	0	2	0	0	0	0	0	0
27	Russia			0	0	0	0	0	0	0	0	0	0	0	0	0
28	South Korea			0	0	0	0	0	0	0	0	0	0	0	0	0
29	Soviet Union			0	0	0	0	0	0	7	8	8	8	8	8	8
30	Spain			0	0	0	1	0	1	0	0	0	0	0	0	0
31	United Kingdom			5	5	4	6	6	5	3	4	4	4	4	5	6
32	United States			9	9	9	9	9	9	9	9	9	9	9	9	9
33	West Germany			0	0	0	0	0	0	6	6	6	6	6	7	7
34																
35																

904
 905 Note. Replace null in cells with zero
 906

907 This is the dataset used for Raschonline
 908

909 2020,2015,2010,2005,2000,1995,1990,1985,1980,1975,197
 910 0,1965,1960,name,group
 911 0,1,3,0,0,3,1,0,1,0,0,0,0,Brazil,1
 912 1,0,0,2,2,0,0,2,2,2,1,0,2,Canada,0
 913 8,8,8,5,4,2,0,1,0,1,2,3,4,China,3
 914 3,4,5,4,5,6,5,5,5,5,5,6,5,France,2
 915 6,6,6,7,7,7,0,0,0,0,0,0,0,0,Germany,2
 916 4,3,1,0,0,0,0,0,0,0,0,1,0,India,3
 917 2,2,2,3,3,4,4,3,3,3,3,2,1,Italy,2
 918 7,7,7,8,8,8,8,7,7,7,7,4,3,Japan,3
 919 0,0,0,0,1,0,2,0,0,0,0,0,0,Mexico,1
 920 0,0,0,0,0,0,0,0,0,0,0,0,0,Russia,2
 921 0,0,0,0,0,0,0,0,0,0,0,0,0,South Korea,3
 922 0,0,0,0,0,0,7,8,8,8,8,8,Soviet Union,2
 923 0,0,0,1,0,1,0,0,0,0,0,0,0,Spain,2
 924 5,5,4,6,6,5,3,4,4,4,4,5,6,United Kingdom,2
 925 9,9,9,9,9,9,9,9,9,9,9,9,United States,0
 926 0,0,0,0,0,6,6,6,6,6,7,7,West Germany,2

927

928

```
2020,2015,2010,2005,2000,1995,1990,1985,1980,1975,1970,1965,1  
960,name,group  
0,1,3,0,0,3,1,0,1,0,0,0,0,Brazil,1  
1,0,0,2,0,0,2,2,2,1,0,2,Canada,0  
8,8,8,5,4,2,0,1,0,1,2,3,4,China,3  
3,4,5,4,5,6,5,5,5,5,5,5,France,2  
6,6,6,7,7,7,0,0,0,0,0,0,0,Germany,2  
4,3,1,0,0,0,0,0,0,0,0,1,0,India,3  
2,2,2,3,3,4,4,3,3,3,3,2,1,Italy,2  
7,7,7,8,8,8,7,7,7,4,3,Japan,3  
0,0,0,0,1,0,2,0,0,0,0,0,0,Mexico,1  
0,0,0,0,0,0,0,0,0,0,0,0,0,Russia,2  
0,0,0,0,0,0,0,0,0,0,0,0,0,South Korea,3
```

Copy & Paste data

Clear Back Refresh

Visual displays Wright Map

KIDMAP person# 15

Bubble Size 3

Submit

WrightMap(or ICC) dotted with dashes Yes

adjustwright Wright move to left 0

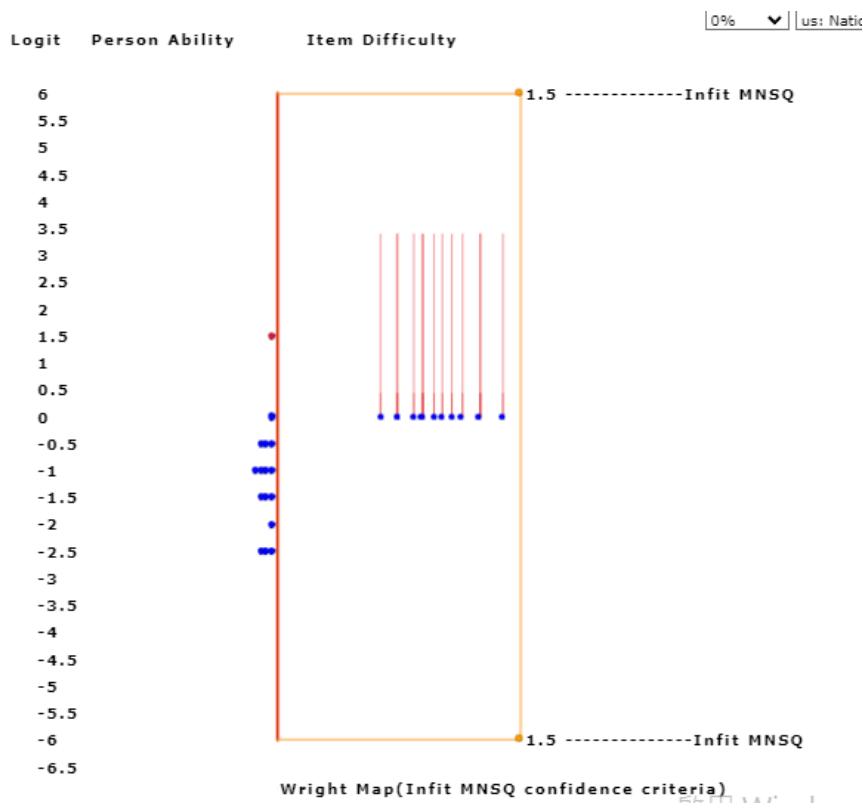
Fit Types Infit MNSQ

ICC Item# 1

Group# 1

929

930



931

932

The red dot is denoted by US(i.e., person 15)

Clear **Back** **Refresh**

Visual displays **Wright Map**

KIDMAP person# **15**

Bubble Size **3**

Submit

WrightMap(or ICC) dotted with dashes **No**

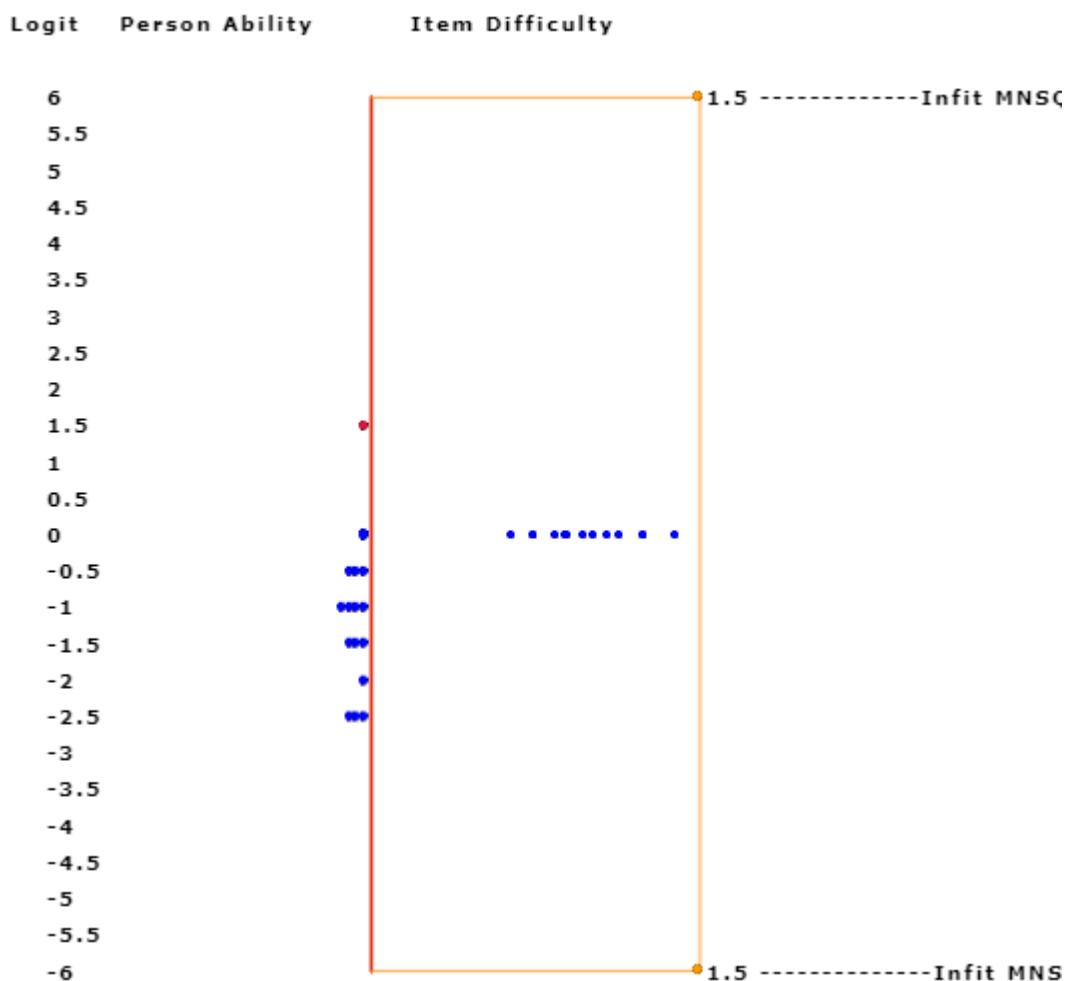
adjustwright Wright move to left **0**

Fit Types **Infit MNSQ**

ICC Item# **1**

Group# **1**

933



934

2020,2015,2010,2005,2000,1995,1990,1985,1980,1975,1970,1965,1
960,name,group
0,1,3,0,0,3,1,0,1,0,0,0,0,Brazil,1
1,0,0,2,2,0,0,2,2,2,1,0,2,Canada,0
8,8,8,5,4,2,0,1,0,1,2,3,4,China,3
3,4,5,4,5,6,5,5,5,5,5,6,5,France,2
6,6,6,7,7,7,0,0,0,0,0,0,Germany,2
4,3,1,0,0,0,0,0,0,0,1,0,India,3
2,2,2,3,3,4,4,3,3,3,3,2,1,Italy,2
7,7,7,8,8,8,7,7,7,7,4,3,Japan,3
0,0,0,0,1,0,2,0,0,0,0,0,0,Mexico,1
0,0,0,0,0,0,0,0,0,0,0,0,Russia,2
0,0,0,0,0,0,0,0,0,0,0,0,South Korea,3

Copy & Paste data

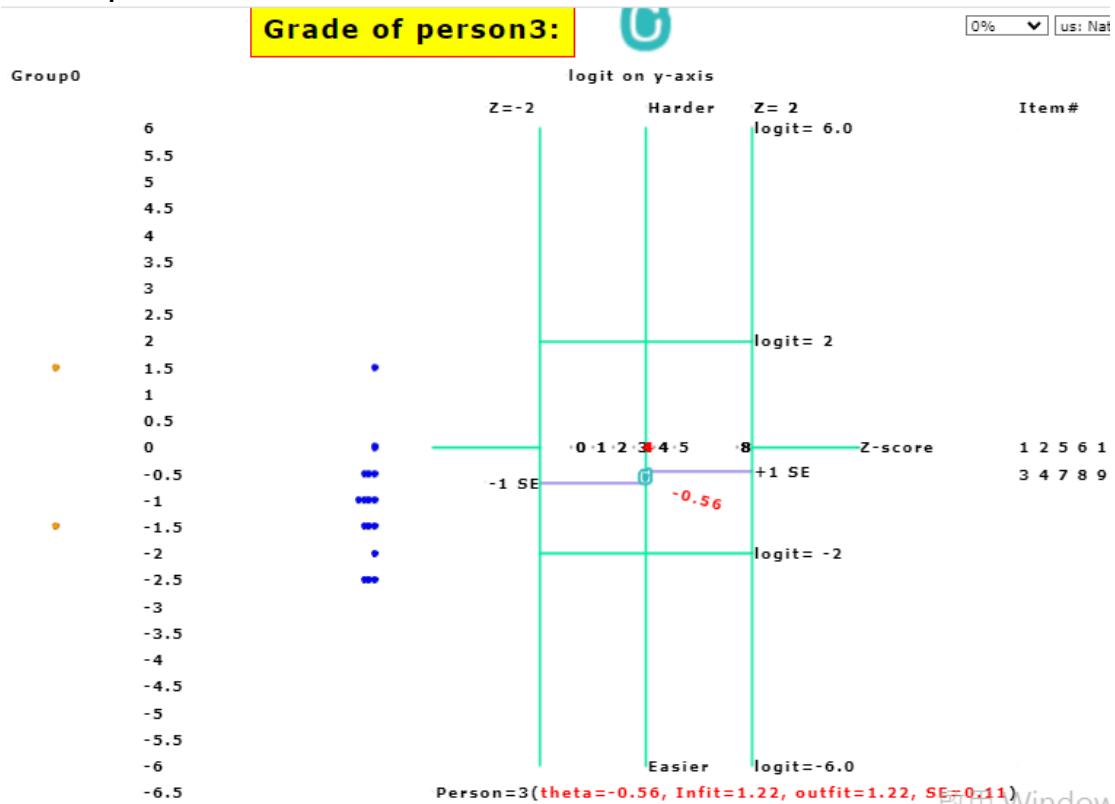
Clear **Back** **Refresh**

Visual displays KIDMAP
KIDMAP person# 3
Bubble Size 3
Submit
Fit Types Outfit MNSQ
ICC Item# 1
Group# 1

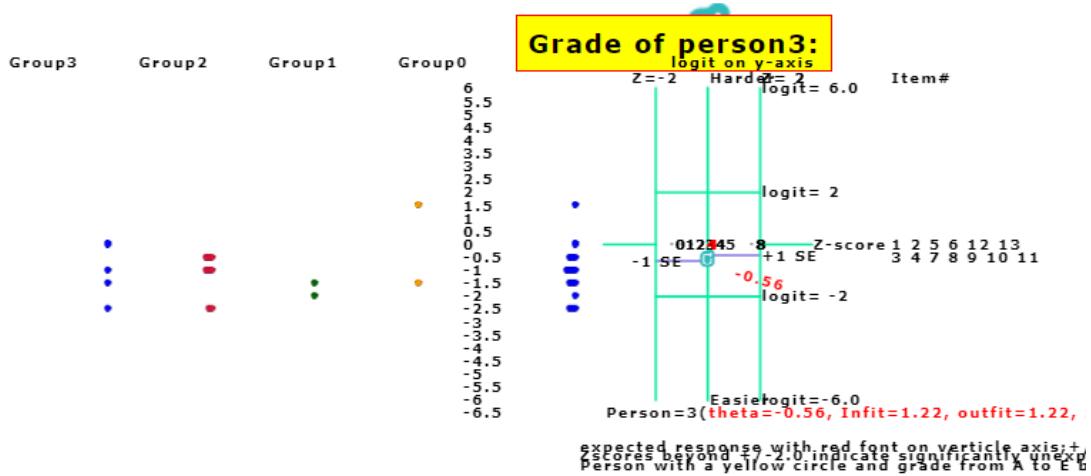
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Note. person 3=China



937



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939 Note. Groups are defined by North American, South
940 American, Europe, and Asia, respectively.

ANOVA	Virable	SS	df	MSS	F	p
	Between	3.79	3	1.26	1.43	=FDIST(1.43,3,12)
	Within	10.59	12	0.88		p-value(Click on Me)
	TSS	14.38	15		All mean=	2.81

941

942 ANOVA for difference in measures among groups

F-ratio value:	<input type="text" value="1.43"/>
DF- numerator:	<input type="text" value="3"/>
DF- denominator:	<input type="text" value="12"/>



Significance Level:

- .01
- .05
- .10

The p-value is .28254. The result is not significant at $p < .05$.

943

++
Strata item= All items

Strata	Sum(n*k)	Mean	Expected	Variance
B_1(>1.0)	117	13	9	116.98 0.02
C_2(>-1.5)	463	143	3.24	465.18 679.62
D_3(>-4.0)	5	52	0.1	5.03 8.79
ChSQ=			4.25df= 26	prob.= 1

Ref. in Eq 4(click)

Strata_raw score item=1

Strat	Sumn	Mean	Expected	Variance
B_1(>1.0)	9	1	9	9 0
C_2(>-1.5)	36	11	3.27	35.78 52.28
D_3(>-4.0)	0	4	0	0.39 0.68
ChSQ=			0.22df= 2	prob.= 0.9

Ref. in Eq 4(click)

944

chSO1 =====

Person	RAW_SCOUNTMEAS.	SE	Infit	Outfit
MEAN	36.6	13	-0.84	0.5
S.D.	33.47	0	0.94	0.66
MAX.	117	13	1.76	1.84
MIN.	0	13	-2.12	0.11
REAL RMSE	0.83	ADJ.SD 0.45	SEPARATION 0.54	PersonRELIAB.0.23
MODEL RMSE	0.82	ADJ.SD 0.46	SEPERATION 0.56	PersonRELIAB.0.24
Cronbach's alpha=0		Step delta=		
	0.47	-0.9	-0.73	-0.61 -0.53-0.45-0.37-0.283.41

Item	RAW_SCOUNTMEAS.	SE	Infit	Outfit
MEAN	45	16	0	0.14 0.99 0.71
S.D.	0	0	0	0.33 0.21 0.23
MAX.	45	16	0	0.14 1.39 1
MIN.	45	16	0	0.14 0.64 0.4
REAL RMSE	0.15	ADJ.SD 0.03	SEPARATION 0.21	ItemRELIAB.0.04
MODEL RMSE	0.37	ADJ.SD 0.03	SEPERATION 0.22	ItemRELIAB.0.05

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Item statistics

No.	Item	Difficulty	Model SE	Infit	MNSQ	Outfit	MNSQ	Raw Score	2 SE(infit)	2 SE(o)
1	0	0.14	1.39	1.05	45	2.52	0.58			
2	0	0.14	1.25	0.82	45	2.52	0.58			
3	0	0.14	1.25	0.82	45	2.52	0.58			
4	0	0.14	1.02	0.77	45	2.52	0.58			
5	0	0.14	0.97	0.65	45	2.52	0.58			
6	0	0.14	1.14	0.97	45	2.52	0.58			
7	0	0.14	0.89	0.95	45	2.52	0.58			
8	0	0.14	0.74	0.43	45	2.52	0.58			
9	0	0.14	0.84	0.47	45	2.52	0.58			
10	0	0.14	0.74	0.43	45	2.52	0.58			
11	0	0.14	0.64	0.37	45	2.52	0.58			
12	0	0.14	0.9	0.65	45	2.52	0.58			
13	0	0.14	1.08	0.87	45	2.52	0.58			

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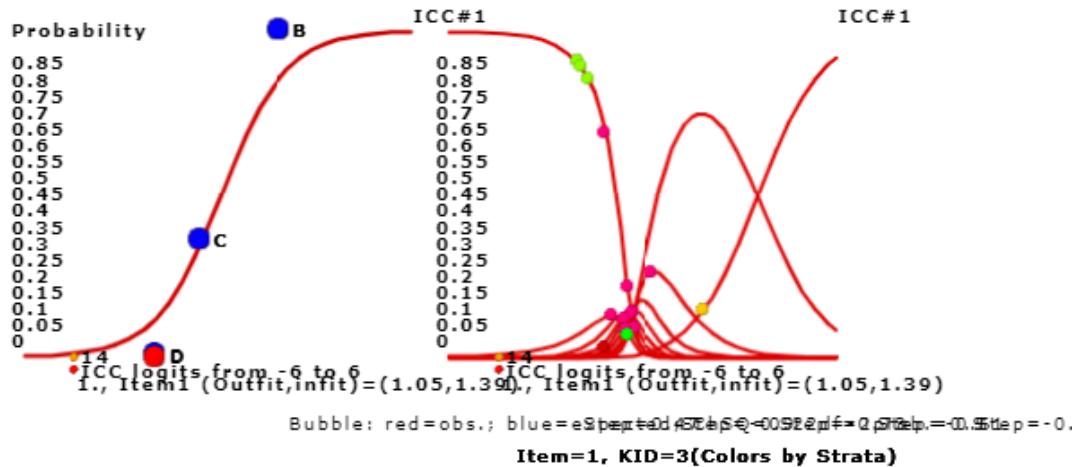
Person measures

N	Perso	Grad	Theta	Model	S	InfitMNS	OutfitMNS	Chi_2	Raw Scor	Category number=10	SE(infit)
n		e	a	E	Q	Q	q	e			
1	1	C05	-1.25	0.22	0.69	0.69	1	9	0.26		
2	0	C05	-1.06	0.17	0.31	0.31	1	14	0.12		
3	3	C04	-0.56	0.11	1.22	1.22	1	46	0.04		
4	2	C04	-0.36	0.11	0.1	0.1	1	63	0.04		
5	2	C04	-0.64	0.11	1.67	1.67	1	39	0.04		
6	3	C05	-1.25	0.22	0.97	0.97	1	9	0.26		
7	2	C04	-0.69	0.11	0.11	0.11	1	35	0.04		
8	3	C03	0.13	0.19	0.98	0.98	1	88	0.16		
9	1	D02	-1.77	0.43	0.78	0.78	1	3	1.56		
10	2	D02	-2.12	1.35	1	1	1	0	1019154.7		
									8		
11	3	D02	-2.12	1.35	1	1	1	0	1019154.7		
									8		
12	2	C04	-0.46	0.11	2.38	2.38*	1	55	0.04		
13	2	D02	-2.01	0.55	0.51	0.51	1	2	2.94		
14	2	C04	-0.38	0.11	0.14	0.14	1	61	0.04		
15	0	B04	1.76	0.19	1	1	1	117	3134.02		
16	2	C04	-0.58	0.11	1.51	1.51	1	44	0.04		

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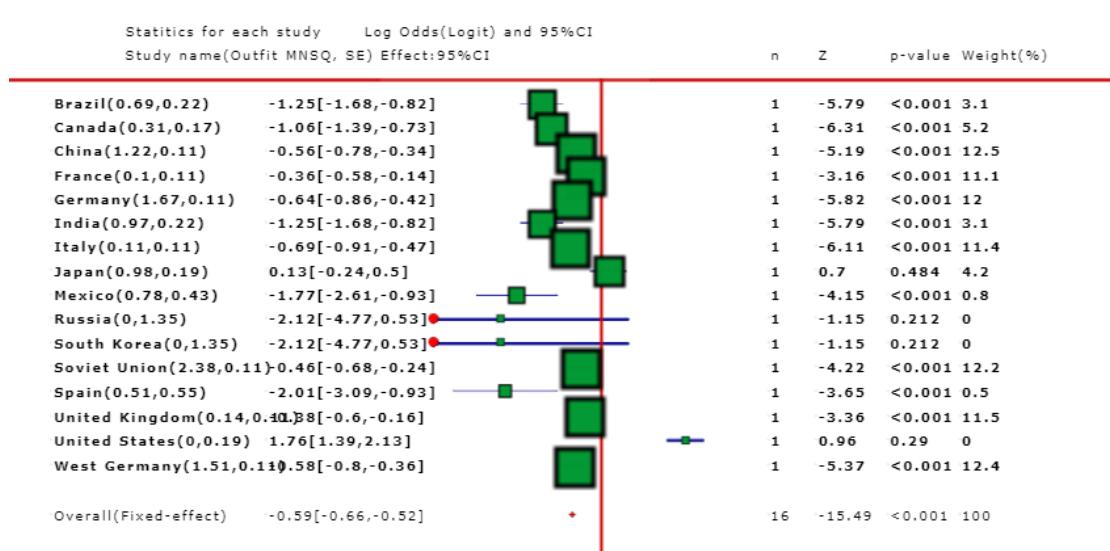
Japan(#8) ranks the second place.



952

953

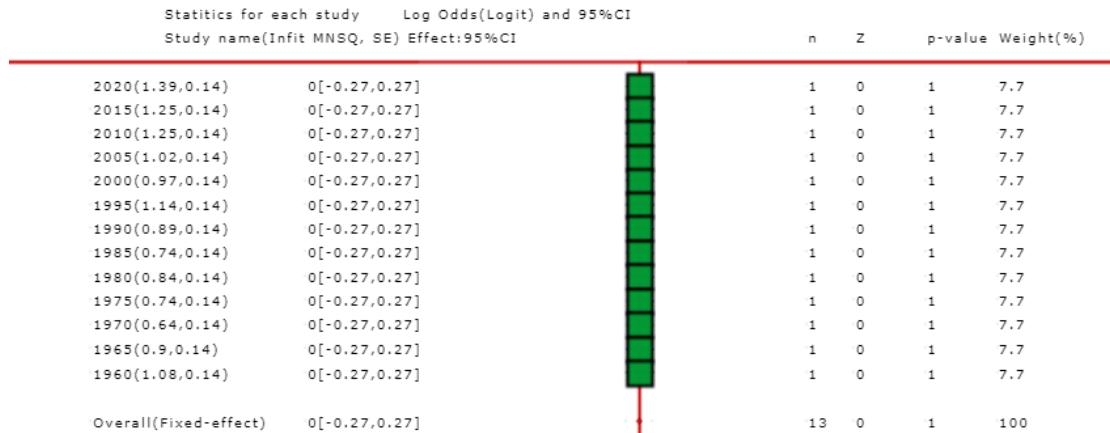
ICC for item #1



954

955

Person forest



956

957

Item forest