## Power rates for different scenarios: data = MC\_SIMU\_20\_all\_disc Cases with variation of discrimination parameter in all items, including AIC and BIC selection rates for model (1) that allows for different item discriminations.

April 5, 2023

```
# MCMC simulation: MC_SIMU_20_all_disc
#
          C D
                 Ε
                    F
        В
       7 9 11 15 21 31
         I II III IV
                      V VI
# npers = 100,200,300,500, 750,1000, 1500, 2000
# Discrimination deviation in all items, drawn from U(.9, 1.1), first k parameters
 selected per setting:
  d_vec <- c(1.05, 0.98, 0.99, 1.08, 0.92, 0.95, 1.01, 0.97, 1.03, 1.05,
            1.1, 0.94, 1.06, 1.08, 0.91, 1, 1.01, 1.05, 1.02, 1, 0.96, 0.95,
            1, 1.01, 1.09, 1.02, 1.04, 1.04, 1.07, 1.05, 1.04)
# Differing effect strengths:
# d = 0, all discrim. equal 1 (no deviation)
# d = 1, deviations from 1 as in d_vec
# d = 2, deviation of disc-values from 1 in d_vec doubled
# d = 3, deviation of disc-values from 1 in d_vec tripled
# d = 4, deviation of disc-values from 1 in d_vec quadrupled
```

Note. ALRT is used as an abbreviation for Andersen's likelihood ratio test, Mod.LRT for the likelihood ratio test based on the modified approach, Score, Wald, and Gradient for the respective other tests of the modified approach, Marg.LRT for the likelihood ratio test based on the marginal maximum likelihood procedure, and perc. for percentile.  $n_*$  denotes the number of all persons, also the ones with a person score r=0,k (number of correct responses), while  $n_{inf}$  marks the average number of persons with informative score 0 < r < k.

Table 1: Observed power rates in percentages referring to scenarios of k = 5 items. The discrimination parameter of all items are drawn from  $U(1-.1\cdot d,1+.1\cdot d)$ . The assumed level of the tests is  $\alpha$  = 0.05.

5         100         0         90         3.71         4.39         4.25         2.65         5.40         8.06         0.08         5.66           5         100         2         90         3.12         4.17         3.97         2.42         5.20         8.25         0.13         5.43           5         100         2         90         3.59         4.51         4.42         2.69         5.63         8.44         0.04         5.85           5         100         3         90         4.01         5.55         5.47         3.27         6.90         10.27         0.13         7.16           5         200         0         180         3.66         5.07         4.74         3.83         5.59         9.00         0.02         5.73           5         200         1         180         4.02         4.82         4.50         3.56         5.63         9.39         0.02         5.81           5         200         1         181         4.92         6.27         5.86         4.72         7.08         10.94         0.04         7.33           5         200         1         182         6.63 <t< th=""><th>k</th><th><math>n_*</math></th><th>d</th><th><math>n_{inf}</math></th><th>ALRT</th><th>Mod.LRT</th><th>Score</th><th>Wald</th><th>Gradient</th><th>rate_AIC</th><th>rate_BIC</th><th>Marg.LRT</th></t<>	k	$n_*$	d	$n_{inf}$	ALRT	Mod.LRT	Score	Wald	Gradient	rate_AIC	rate_BIC	Marg.LRT
5         100         1         90         3.12         4.17         3.97         2.42         5.20         8.25         0.13         5.43           5         100         2         90         3.59         4.51         4.42         2.69         5.63         8.44         0.04         5.85           5         100         4         91         4.48         6.57         5.89         4.22         7.74         11.09         0.28         7.97           5         200         0         180         3.66         5.07         4.74         3.83         5.59         9.00         0.02         5.73           5         200         1         180         4.02         4.82         4.50         3.56         5.63         9.39         0.02         5.81           5         200         2         181         4.92         6.27         5.86         4.72         7.08         10.94         0.04         7.33           5         200         2         181         5.05         7.83         7.53         6.26         8.61         12.95         0.12         9.22           5         200         3         182         5.66	5	100	0	90	3.71	4.39	4.25	2.65	5.40	8.06	0.08	5.66
5         100         3         90         4.01         5.55         5.47         3.27         6.90         10.27         0.13         7.16           5         200         0         180         3.66         5.07         4.74         3.83         5.59         9.00         0.02         5.73           5         200         1         180         4.02         4.82         4.50         3.56         5.63         9.39         0.02         5.81           5         200         2         181         4.92         6.27         5.86         4.72         7.08         10.94         0.04         7.33           5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         300         2         7.0         4.38         5.19         5.02         4.40         5.62         9.30         0.04         5.64           5         300         2         271         5.66         7.15         6.87         6.01         7.62         9.30         0.04         5.64           5         300         2         271         5.66		100	1	90	3.12	4.17	3.97	2.42	5.20	8.25	0.13	5.43
5         100         4         91         4.48         6.57         5.89         4.22         7.74         11.09         0.28         7.97           5         200         0         180         3.66         5.07         4.74         3.83         5.59         9.00         0.02         5.81           5         200         2         181         4.92         4.82         4.50         3.56         5.63         9.39         0.02         5.81           5         200         2         181         4.92         6.27         5.86         4.72         7.08         10.94         0.04         7.33           5         200         3         181         5.05         7.83         7.53         6.26         8.61         12.95         0.12         9.22           5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         300         2         271         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         3         272         10.67		100	2	90	3.59	4.51	4.42	2.69	5.63	8.44	0.04	5.85
5         200         0         180         3.66         5.07         4.74         3.83         5.59         9.00         0.02         5.73           5         200         1         180         4.02         4.82         4.50         3.56         5.63         9.39         0.02         5.81           5         200         2         181         4.92         6.27         5.86         4.72         7.08         10.94         0.04         7.33           5         200         3         181         5.05         7.83         7.53         6.26         8.61         12.95         0.12         9.22           5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         300         0         270         4.38         5.19         5.02         4.40         5.62         9.30         0.04         5.64           5         300         1         270         5.10         5.58         5.36         4.69         6.05         9.86         0.02         8.30           5         300         2         715         5.66		100	3	90	4.01	5.55	5.47	3.27	6.90	10.27	0.13	7.16
5         200         1         180         4.02         4.82         4.50         3.56         5.63         9.39         0.02         5.81           5         200         2         181         4.92         6.27         5.86         4.72         7.08         10.94         0.04         7.33           5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         300         0         270         4.38         5.19         5.02         4.40         5.62         9.30         0.04         5.64           5         300         1         270         5.10         5.58         5.36         4.69         6.05         9.80         0.02         8.20           5         300         2         271         5.66         7.11         10.75         9.69         11.73         17.57         0.11         13.05           5         300         4         4.97         5.	5	100	4	91	4.48	6.57	5.89	4.22	7.74	11.09	0.28	7.97
5         200         2         181         4.92         6.27         5.86         4.72         7.08         10.94         0.04         7.33           5         200         3         181         5.05         7.83         7.53         6.26         8.61         12.95         0.012         9.22           5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         300         0         270         4.38         5.19         5.02         4.40         5.62         9.30         0.04         5.64           5         300         1         270         5.10         5.58         5.36         4.69         6.05         9.86         0.02         8.30           5         300         2         271         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         4         272         10.67         16.04         16.78         14.49         16.91         23.90         0.21         13.02           5         500         1         450         5.												
5         200         3         181         5.05         7.83         7.53         6.26         8.61         12.95         0.12         9.22           5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         300         1         270         5.10         5.58         5.36         4.69         6.05         9.86         0.02         6.30           5         300         1         270         5.10         5.58         5.36         4.69         6.05         9.86         0.02         8.27           5         300         2         271         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         4         272         10.67         16.04         15.78         14.49         16.91         23.90         0.21         19.32           5         500         4         49         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.74           5         500         1         450         5.66<	5											
5         200         4         182         6.63         10.86         10.57         9.07         11.67         17.33         0.23         13.47           5         300         0         270         4.38         5.19         5.02         4.40         5.62         9.30         0.04         5.64           5         300         1         270         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         2         271         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         3         272         7.67         11.14         10.75         9.69         11.73         17.57         0.11         13.05           5         300         4         272         10.67         16.04         15.78         14.49         16.91         23.90         0.21         19.32           5         500         4         449         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.22           5         500         2         452 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>												
5         300         0         270         4.38         5.19         5.02         4.40         5.62         9.30         0.04         5.64           5         300         1         270         5.10         5.58         5.36         4.69         6.05         9.86         0.02         6.30           5         300         2         271         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         3         272         7.67         11.14         10.75         9.69         11.73         17.57         0.11         13.05           5         300         4         272         10.67         16.04         15.78         14.49         16.91         23.90         0.21         19.32           5         500         0         449         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.74           5         500         1         450         5.68         6.10         5.95         5.52         6.45         10.59         0.01         6.86           5         500         3         453         12.1												
5         300         1         270         5.10         5.58         5.36         4.69         6.05         9.86         0.02         6.30           5         300         2         271         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         3         272         7.67         11.14         10.75         9.69         11.73         17.57         0.11         13.05           5         300         4         272         10.67         16.04         15.78         14.49         16.91         23.90         0.21         19.32           5         500         0         449         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.74           5         500         1         450         5.68         6.10         5.95         5.52         6.45         10.59         0.01         6.86           5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.52           5         500         2         452         7												
5         300         2         271         5.66         7.15         6.87         6.01         7.62         12.36         0.02         8.27           5         300         3         272         7.67         11.14         10.75         9.69         11.73         17.57         0.11         13.05           5         300         4         272         10.67         16.04         15.78         14.49         16.91         23.90         0.21         19.32           5         500         0         449         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.74           5         500         1         450         5.68         6.10         5.95         5.52         6.45         10.59         0.01         6.86           5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.59           5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454												
5         300         4         272         10.67         16.04         15.78         14.49         16.91         23.90         0.21         19.32           5         500         0         449         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.74           5         500         1         450         5.68         6.10         5.95         5.52         6.45         10.59         0.01         6.86           5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.52           5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454         18.15         25.76         25.52         24.51         26.48         36.22         0.53         30.45           5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676	5											
5         300         4         272         10.67         16.04         15.78         14.49         16.91         23.90         0.21         19.32           5         500         0         449         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.74           5         500         1         450         5.68         6.10         5.95         5.52         6.45         10.59         0.01         6.86           5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.52           5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454         18.15         25.76         25.52         24.51         26.48         36.22         0.53         30.45           5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676	5											
5         500         0         449         5.35         5.44         5.13         4.71         5.75         9.74         0.01         5.74           5         500         1         450         5.68         6.10         5.95         5.52         6.45         10.59         0.01         6.86           5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.52           5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454         18.15         25.76         25.52         24.51         26.48         36.22         0.53         30.45           5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676         6.07         6.40         6.24         5.98         6.55         10.95         0.00         4.38           5         750         1         676 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>												
5         500         1         450         5.68         6.10         5.95         5.52         6.45         10.59         0.01         6.86           5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.52           5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454         18.15         25.76         25.52         24.51         26.48         36.22         0.53         30.45           5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676         6.07         6.40         6.24         5.98         6.55         10.95         0.00         6.66           5         750         2         678         9.64         12.30         12.16         11.59         12.72         19.31         0.04         13.98           5         750         3         679	5	300	4	272	10.67	16.04	15.78	14.49	16.91	23.90	0.21	19.32
5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.52           5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454         18.15         25.76         25.52         24.51         26.48         36.22         0.53         30.45           5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676         6.07         6.40         6.24         5.98         6.55         10.95         0.00         6.66           5         750         2         678         9.64         12.30         12.16         11.59         12.72         19.31         0.04         13.98           5         750         3         679         16.04         23.03         22.80         22.06         23.52         32.58         0.20         26.78           5         750         4         681	5	500	0	449	5.35	5.44	5.13	4.71	5.75	9.74	0.01	5.74
5         500         2         452         7.88         9.65         9.21         8.62         10.13         15.64         0.10         10.52           5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454         18.15         25.76         25.52         24.51         26.48         36.22         0.53         30.45           5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676         6.07         6.40         6.24         5.98         6.55         10.95         0.00         6.66           5         750         2         678         9.64         12.30         12.16         11.59         12.72         19.31         0.04         13.98           5         750         3         679         16.04         23.03         22.80         22.06         23.52         32.58         0.20         26.78           5         750         4         681	5	500	1	450	5.68	6.10	5.95	5.52	6.45	10.59	0.01	6.86
5         500         3         453         12.10         16.40         16.18         15.41         16.97         24.28         0.12         19.17           5         500         4         454         18.15         25.76         25.52         24.51         26.48         36.22         0.53         30.45           5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676         6.07         6.40         6.24         5.98         6.55         10.95         0.00         6.66           5         750         2         678         9.64         12.30         12.16         11.59         12.72         19.31         0.04         13.98           5         750         3         679         16.04         23.03         22.80         22.06         23.52         32.58         0.20         26.78           5         750         4         681         27.80         38.81         38.80         38.00         39.14         49.76         0.79         44.43           5         1000         1         901	5	500	2	452	7.88	9.65	9.21	8.62	10.13	15.64	0.10	10.52
5         750         0         674         4.84         5.16         5.02         4.83         5.29         9.25         0.01         5.10           5         750         1         676         6.07         6.40         6.24         5.98         6.55         10.95         0.00         6.66           5         750         2         678         9.64         12.30         12.16         11.59         12.72         19.31         0.04         13.98           5         750         3         679         16.04         23.03         22.80         22.06         23.52         32.58         0.20         26.78           5         750         4         681         27.80         38.81         38.88         38.00         39.14         49.76         0.79         44.43           5         1000         0         899         4.38         4.51         4.57         4.30         4.70         8.57         0.00         4.91           5         1000         1         901         6.22         7.01         6.67         6.49         7.19         11.92         0.01         7.56           5         1000         2         903	5	500	3	453	12.10	16.40	16.18	15.41	16.97	24.28	0.12	19.17
5         750         1         676         6.07         6.40         6.24         5.98         6.55         10.95         0.00         6.66           5         750         2         678         9.64         12.30         12.16         11.59         12.72         19.31         0.04         13.98           5         750         3         679         16.04         23.03         22.80         22.06         23.52         32.58         0.20         26.78           5         750         4         681         27.80         38.81         38.88         38.00         39.14         49.76         0.79         44.43           5         1000         0         899         4.38         4.51         4.57         4.30         4.70         8.57         0.00         4.91           5         1000         1         901         6.22         7.01         6.67         6.49         7.19         11.92         0.01         7.56           5         1000         2         903         11.35         15.15         14.94         14.45         15.33         22.73         0.04         16.99           5         1000         3         906 <td>5</td> <td>500</td> <td>4</td> <td>454</td> <td>18.15</td> <td>25.76</td> <td>25.52</td> <td>24.51</td> <td>26.48</td> <td>36.22</td> <td>0.53</td> <td>30.45</td>	5	500	4	454	18.15	25.76	25.52	24.51	26.48	36.22	0.53	30.45
5         750         4         681         27.80         38.81         38.88         38.00         39.14         49.76         0.79         44.43           5         1000         0         899         4.38         4.51         4.57         4.30         4.70         8.57         0.00         4.91           5         1000         1         901         6.22         7.01         6.67         6.49         7.19         11.92         0.01         7.56           5         1000         2         903         11.35         15.15         14.94         14.45         15.33         22.73         0.04         16.99           5         1000         3         906         21.31         30.28         30.18         29.55         30.58         40.84         0.20         34.39           5         1000         4         908         36.55         52.50         52.18         51.42         52.67         62.52         1.36         58.66           5         1500         0         1348         4.80         5.04         5.15         5.01         5.14         9.43         0.00         5.03           5         1500         1         13		750	0	674		5.16			5.29	9.25		5.10
5         750         4         681         27.80         38.81         38.88         38.00         39.14         49.76         0.79         44.43           5         1000         0         899         4.38         4.51         4.57         4.30         4.70         8.57         0.00         4.91           5         1000         1         901         6.22         7.01         6.67         6.49         7.19         11.92         0.01         7.56           5         1000         2         903         11.35         15.15         14.94         14.45         15.33         22.73         0.04         16.99           5         1000         3         906         21.31         30.28         30.18         29.55         30.58         40.84         0.20         34.39           5         1000         4         908         36.55         52.50         52.18         51.42         52.67         62.52         1.36         58.66           5         1500         0         1348         4.80         5.04         5.15         5.01         5.14         9.43         0.00         5.03           5         1500         1         13	5											
5         750         4         681         27.80         38.81         38.88         38.00         39.14         49.76         0.79         44.43           5         1000         0         899         4.38         4.51         4.57         4.30         4.70         8.57         0.00         4.91           5         1000         1         901         6.22         7.01         6.67         6.49         7.19         11.92         0.01         7.56           5         1000         2         903         11.35         15.15         14.94         14.45         15.33         22.73         0.04         16.99           5         1000         3         906         21.31         30.28         30.18         29.55         30.58         40.84         0.20         34.39           5         1000         4         908         36.55         52.50         52.18         51.42         52.67         62.52         1.36         58.66           5         1500         0         1348         4.80         5.04         5.15         5.01         5.14         9.43         0.00         5.03           5         1500         1         13	5							11.59		19.31		
5       1000       0       899       4.38       4.51       4.57       4.30       4.70       8.57       0.00       4.91         5       1000       1       901       6.22       7.01       6.67       6.49       7.19       11.92       0.01       7.56         5       1000       2       903       11.35       15.15       14.94       14.45       15.33       22.73       0.04       16.99         5       1000       3       906       21.31       30.28       30.18       29.55       30.58       40.84       0.20       34.39         5       1000       4       908       36.55       52.50       52.18       51.42       52.67       62.52       1.36       58.66         5       1500       0       1348       4.80       5.04       5.15       5.01       5.14       9.43       0.00       5.03         5       1500       1       1351       6.85       7.78       7.91       7.73       7.88       13.77       0.01       8.82         5       1500       2       1355       15.37       21.03       20.90       20.63       21.24       29.97       0.07       23.85<	5					23.03		22.06	23.52	32.58		
5       1000       1       901       6.22       7.01       6.67       6.49       7.19       11.92       0.01       7.56         5       1000       2       903       11.35       15.15       14.94       14.45       15.33       22.73       0.04       16.99         5       1000       3       906       21.31       30.28       30.18       29.55       30.58       40.84       0.20       34.39         5       1000       4       908       36.55       52.50       52.18       51.42       52.67       62.52       1.36       58.66         5       1500       0       1348       4.80       5.04       5.15       5.01       5.14       9.43       0.00       5.03         5       1500       1       1351       6.85       7.78       7.91       7.73       7.88       13.77       0.01       8.82         5       1500       2       1355       15.37       21.03       20.90       20.63       21.24       29.97       0.07       23.85         5       1500       3       1359       31.45       45.19       45.15       44.82       45.15       55.94       0.47 <t< td=""><td>5</td><td>750</td><td>4</td><td>681</td><td>27.80</td><td>38.81</td><td>38.88</td><td>38.00</td><td>39.14</td><td>49.76</td><td>0.79</td><td>44.43</td></t<>	5	750	4	681	27.80	38.81	38.88	38.00	39.14	49.76	0.79	44.43
5       1000       2       903       11.35       15.15       14.94       14.45       15.33       22.73       0.04       16.99         5       1000       3       906       21.31       30.28       30.18       29.55       30.58       40.84       0.20       34.39         5       1000       4       908       36.55       52.50       52.18       51.42       52.67       62.52       1.36       58.66         5       1500       0       1348       4.80       5.04       5.15       5.01       5.14       9.43       0.00       5.03         5       1500       1       1351       6.85       7.78       7.91       7.73       7.88       13.77       0.01       8.82         5       1500       2       1355       15.37       21.03       20.90       20.63       21.24       29.97       0.07       23.85         5       1500       3       1359       31.45       45.19       45.15       44.82       45.15       55.94       0.47       51.59         5       1500       4       1362       53.53       72.04       72.22       71.80       72.08       80.24       3.12												
5       1000       3       906       21.31       30.28       30.18       29.55       30.58       40.84       0.20       34.39         5       1000       4       908       36.55       52.50       52.18       51.42       52.67       62.52       1.36       58.66         5       1500       0       1348       4.80       5.04       5.15       5.01       5.14       9.43       0.00       5.03         5       1500       1       1351       6.85       7.78       7.91       7.73       7.88       13.77       0.01       8.82         5       1500       2       1355       15.37       21.03       20.90       20.63       21.24       29.97       0.07       23.85         5       1500       3       1359       31.45       45.19       45.15       44.82       45.15       55.94       0.47       51.59         5       1500       4       1362       53.53       72.04       72.22       71.80       72.08       80.24       3.12       78.81         5       2000       0       1798       4.90       4.55       4.54       4.46       4.64       8.92       0.00	5											
5         1000         4         908         36.55         52.50         52.18         51.42         52.67         62.52         1.36         58.66           5         1500         0         1348         4.80         5.04         5.15         5.01         5.14         9.43         0.00         5.03           5         1500         1         1351         6.85         7.78         7.91         7.73         7.88         13.77         0.01         8.82           5         1500         2         1355         15.37         21.03         20.90         20.63         21.24         29.97         0.07         23.85           5         1500         3         1359         31.45         45.19         45.15         44.82         45.15         55.94         0.47         51.59           5         1500         4         1362         53.53         72.04         72.22         71.80         72.08         80.24         3.12         78.81           5         2000         0         1798         4.90         4.55         4.54         4.46         4.64         8.92         0.00         4.74           5         2000         1	5											
5     1500     0     1348     4.80     5.04     5.15     5.01     5.14     9.43     0.00     5.03       5     1500     1     1351     6.85     7.78     7.91     7.73     7.88     13.77     0.01     8.82       5     1500     2     1355     15.37     21.03     20.90     20.63     21.24     29.97     0.07     23.85       5     1500     3     1359     31.45     45.19     45.15     44.82     45.15     55.94     0.47     51.59       5     1500     4     1362     53.53     72.04     72.22     71.80     72.08     80.24     3.12     78.81       5     2000     0     1798     4.90     4.55     4.54     4.46     4.64     8.92     0.00     4.74       5     2000     1     1802     7.87     9.47     9.40     9.26     9.56     15.78     0.01     10.64       5     2000     2     1807     20.09     27.87     27.95     27.67     27.91     37.64     0.08     31.65       5     2000     3     1812     41.56     57.38     57.52     57.18     57.28     67.50     1.02												
5       1500       1       1351       6.85       7.78       7.91       7.73       7.88       13.77       0.01       8.82         5       1500       2       1355       15.37       21.03       20.90       20.63       21.24       29.97       0.07       23.85         5       1500       3       1359       31.45       45.19       45.15       44.82       45.15       55.94       0.47       51.59         5       1500       4       1362       53.53       72.04       72.22       71.80       72.08       80.24       3.12       78.81         5       2000       0       1798       4.90       4.55       4.54       4.46       4.64       8.92       0.00       4.74         5       2000       1       1802       7.87       9.47       9.40       9.26       9.56       15.78       0.01       10.64         5       2000       2       1807       20.09       27.87       27.95       27.67       27.91       37.64       0.08       31.65         5       2000       3       1812       41.56       57.38       57.52       57.18       57.28       67.50       1.02	5	1000	4	908	36.55	52.50	52.18	51.42	52.67	62.52	1.36	58.66
5     1500     2     1355     15.37     21.03     20.90     20.63     21.24     29.97     0.07     23.85       5     1500     3     1359     31.45     45.19     45.15     44.82     45.15     55.94     0.47     51.59       5     1500     4     1362     53.53     72.04     72.22     71.80     72.08     80.24     3.12     78.81       5     2000     0     1798     4.90     4.55     4.54     4.46     4.64     8.92     0.00     4.74       5     2000     1     1802     7.87     9.47     9.40     9.26     9.56     15.78     0.01     10.64       5     2000     2     1807     20.09     27.87     27.95     27.67     27.91     37.64     0.08     31.65       5     2000     3     1812     41.56     57.38     57.52     57.18     57.28     67.50     1.02     63.60												
5     1500     3     1359     31.45     45.19     45.15     44.82     45.15     55.94     0.47     51.59       5     1500     4     1362     53.53     72.04     72.22     71.80     72.08     80.24     3.12     78.81       5     2000     0     1798     4.90     4.55     4.54     4.46     4.64     8.92     0.00     4.74       5     2000     1     1802     7.87     9.47     9.40     9.26     9.56     15.78     0.01     10.64       5     2000     2     1807     20.09     27.87     27.95     27.67     27.91     37.64     0.08     31.65       5     2000     3     1812     41.56     57.38     57.52     57.18     57.28     67.50     1.02     63.60												
5     1500     4     1362     53.53     72.04     72.22     71.80     72.08     80.24     3.12     78.81       5     2000     0     1798     4.90     4.55     4.54     4.46     4.64     8.92     0.00     4.74       5     2000     1     1802     7.87     9.47     9.40     9.26     9.56     15.78     0.01     10.64       5     2000     2     1807     20.09     27.87     27.95     27.67     27.91     37.64     0.08     31.65       5     2000     3     1812     41.56     57.38     57.52     57.18     57.28     67.50     1.02     63.60												
5     2000     0     1798     4.90     4.55     4.54     4.46     4.64     8.92     0.00     4.74       5     2000     1     1802     7.87     9.47     9.40     9.26     9.56     15.78     0.01     10.64       5     2000     2     1807     20.09     27.87     27.95     27.67     27.91     37.64     0.08     31.65       5     2000     3     1812     41.56     57.38     57.52     57.18     57.28     67.50     1.02     63.60	5	1500	3	1359	31.45	45.19	45.15	44.82	45.15	55.94	0.47	51.59
5     2000     1     1802     7.87     9.47     9.40     9.26     9.56     15.78     0.01     10.64       5     2000     2     1807     20.09     27.87     27.95     27.67     27.91     37.64     0.08     31.65       5     2000     3     1812     41.56     57.38     57.52     57.18     57.28     67.50     1.02     63.60	5	1500	4	1362	53.53	72.04	72.22	71.80	72.08	80.24	3.12	78.81
5     2000     2     1807     20.09     27.87     27.95     27.67     27.91     37.64     0.08     31.65       5     2000     3     1812     41.56     57.38     57.52     57.18     57.28     67.50     1.02     63.60		2000	0	1798	4.90	4.55	4.54	4.46	4.64	8.92	0.00	4.74
5 2000 3 1812 41.56 57.38 57.52 57.18 57.28 67.50 1.02 63.60	5	2000	1	1802	7.87	9.47	9.40	9.26	9.56	15.78	0.01	10.64
	5	2000	2	1807	20.09	27.87	27.95	27.67	27.91	37.64	0.08	31.65
5 2000 4 1817 68 23 84 09 84 19 84 00 84 04 89 78 7 10 89 14	5	2000	3	1812	41.56	57.38	57.52	57.18	57.28	67.50	1.02	63.60
0 2000 + 1017 00.20 07.00 07.10 07.00 07.00 00.70 7.10 00.14	5	2000	4	1817	68.23	84.09	84.19	84.00	84.04	89.78	7.10	89.14

Table 2: Observed power rates in percentages referring to scenarios of k = 7 items. The discrimination parameter of all items are drawn from  $U(1-.1\cdot d,1+.1\cdot d)$ . The assumed level of the tests is  $\alpha$  = 0.05.

k	$n_*$	d	$n_{inf}$	ALRT	Mod.LRT	Score	Wald	Gradient	rate_AIC	rate_BIC	Marg.LRT
7	100	0	95	4.25	5.36	4.91	3.17	6.54	6.56	0.01	6.34
7	100	1	94	4.03	4.92	4.65	3.00	5.93	6.02	0.01	6.01
7	100	2	94	5.03	6.38	6.02	4.09	7.63	7.66	0.02	7.70
7	100	3	94	5.75	8.02	7.47	5.30	9.30	9.57	0.05	10.00
7	100	4	94	8.70	12.08	11.38	8.39	14.32	14.39	0.15	14.41
7	200	0	189	4.34	5.01	4.68	3.84	5.70	6.10	0.00	5.41
7	200	1	189	4.75	5.75	5.72	4.76	6.41	7.04	0.00	6.76
7	200	2	189	6.75	8.45	8.16	7.04	9.17	10.11	0.01	9.43
7	200	3	189	8.87	12.77	12.40	10.71	13.54	14.83	0.02	14.04
7	200	4	188	13.29	19.93	19.64	17.39	21.28	22.89	0.03	22.04
7	300	0	284	4.77	4.73	4.54	4.01	5.11	5.98	0.00	5.19
7	300	1	283	5.61	6.46	6.21	5.52	6.88	7.87	0.01	6.59
7	300	2	283	7.37	9.80	9.58	8.66	10.23	11.42	0.00	10.45
7	300	3	283	11.47	17.05	17.08	15.83	17.70	19.59	0.04	18.57
7	300	4	283	18.81	28.57	28.27	26.65	29.20	31.84	0.12	31.12
7	500	0	473	4.76	4.85	4.72	4.38	5.11	5.86	0.00	4.84
7	500	1	472	5.93	6.78	6.76	6.32	6.89	8.32	0.00	7.48
7	500	2	472	10.03	13.32	13.26	12.59	13.65	15.60	0.00	14.53
7	500	3	471	17.58	26.14	26.30	25.25	26.53	29.64	0.06	28.69
7	500	4	471	31.21	48.44	48.33	46.96	48.99	52.24	0.31	51.91
7	750	0	710	5.06	4.95	4.92	4.68	5.15	6.25	0.00	4.97
7	750	1	709	6.54	7.68	7.53	7.30	7.87	9.35	0.00	7.99
7	750	2	708	12.89	18.13	18.02	17.43	18.53	20.88	0.00	19.70
7	750	3	707	25.40	39.28	39.12	38.43	39.56	42.72	0.04	42.13
7	750	4	707	45.75	67.90	67.87	67.24	68.03	71.00	0.70	71.14
7	1000	0	946	4.79	4.63	4.43	4.27	4.79	5.77	0.00	4.65
7	1000	1	945	7.71	9.08	9.02	8.79	9.13	10.84	0.00	9.24
7	1000	2	944	15.63	23.62	23.50	23.03	23.74	26.49	0.01	25.36
7	1000	3	943	32.56	51.88	51.93	51.36	52.26	55.74	0.14	55.45
7	1000	4	942	58.97	81.55	81.51	81.23	81.71	83.92	1.58	84.17
7	1500	0	1420	5.44	4.89	4.87	4.72	5.00	6.10	0.00	5.06
7	1500	1	1417	8.12	9.93	10.01	9.85	10.05	12.01	0.00	10.52
7	1500	2	1416	22.70	34.93	34.92	34.63	35.18	38.63	0.04	37.03
7	1500	3	1415	49.48	73.77	73.59	73.32	73.93	76.38	0.25	76.53
7	1500	4	1413	78.12	95.28	95.31	95.22	95.34	96.05	6.61	96.48
7	2000	0	1893	4.80	4.99	5.00	4.88	5.02	6.27	0.00	5.15
7	2000	1	1890	9.81	12.89	13.06	12.85	12.88	15.19	0.00	13.52
7	2000	2	1888	28.48	46.29	46.12	45.88	46.37	49.96	0.02	48.88
7	2000	3	1886	63.13	86.75	86.65	86.49	86.84	88.34	1.09	88.80
7	2000	4	1885	90.21	98.94	98.91	98.88	98.95	99.28	17.05	99.30

Table 3: Observed power rates in percentages referring to scenarios of k = 9 items. The discrimination parameter of all items are drawn from  $U(1-.1\cdot d,1+.1\cdot d)$ . The assumed level of the tests is  $\alpha$  = 0.05.

9 100 0 97 3.83 5.32 4.78 3.06 6.86 4.63 0.00 6.50 9 100 1 97 3.83 5.33 5.08 3.24 6.72 4.61 0.00 6.80 9 100 2 97 4.85 7.08 6.39 4.31 8.48 6.22 0.00 7.93 9 100 3 97 6.08 8.58 8.18 5.62 10.62 7.66 0.01 10.80 9 200 0 194 4.73 5.09 4.83 3.85 5.74 4.21 0.00 5.58 9 200 1 194 5.41 6.34 6.02 4.90 7.00 5.43 0.00 6.77 9 200 2 194 6.77 8.87 8.44 7.32 9.56 7.68 0.00 9.55 9 200 3 194 9.60 14.15 13.68 12.01 15.22 12.47 0.00 15.34 9 200 1 291 5.01 4.84 4.66 4.04 5.28 4.21 0.00 5.57 9 300 1 291 5.75 6.56 6.27 5.47 7.07 5.56 0.00 6.87 9 300 2 291 8.45 11.14 10.93 9.66 11.81 9.71 0.00 11.50 9 300 3 291 13.97 21.27 21.12 19.43 22.18 19.27 0.01 12.15 9 500 1 485 6.47 7.14 7.18 6.66 7.51 5.98 0.00 7.37 9 500 2 485 11.15 15.50 15.19 14.56 15.87 13.95 0.00 15.89 9 500 3 485 20.81 33.91 33.87 32.73 34.44 31.50 0.03 34.50 9 750 0 728 5.19 5.20 5.07 4.91 5.32 4.44 0.00 5.27 9 750 1 727 7.18 9.04 9.00 8.65 9.16 7.73 0.00 15.34 9 750 0 728 5.19 5.20 5.07 4.91 5.32 4.44 0.00 5.27 9 750 1 727 7.18 9.04 9.00 8.65 9.16 7.73 0.00 9.23 9 750 2 728 14.27 21.72 21.67 20.87 22.07 19.49 0.00 22.26 9 750 3 728 29.57 50.24 49.88 49.22 50.73 47.31 0.01 51.10 9 1000 0 970 4.81 4.78 4.68 4.49 4.88 3.98 0.00 7.37 9 1000 1 970 8.19 9.96 9.81 9.51 10.05 8.82 0.00 1.455 9.08 11.91 1.10 1.05 8.82 0.00 1.455 9.08 11.91 1.10 1.05 8.82 0.00 1.455 9.08 11.91 1.10 1.05 8.82 0.00 1.51 9.90 1.01 1.00 1.00 1.00 1.00 1.00 1.0	k	$n_*$	d	$n_{inf}$	ALRT	Mod.LRT	Score	Wald	Gradient	rate_AIC	rate_BIC	Marg.LRT
9         100         1         97         3.83         5.33         5.08         3.24         6.72         4.61         0.00         6.80           9         100         2         97         4.85         7.08         6.39         4.31         8.48         6.22         0.00         7.93           9         200         0         194         4.73         5.09         4.83         3.85         5.74         4.21         0.00         5.58           9         200         1         194         5.41         6.34         6.02         4.90         7.00         5.43         0.00         6.77           9         200         2         194         6.77         8.87         8.44         7.32         9.56         7.68         0.00         9.55           9         200         3         194         9.60         14.15         13.68         12.01         15.22         12.47         0.00         15.34           9         300         1         291         5.75         6.56         6.27         5.47         7.07         5.56         0.00         6.87           9         300         1         291         5.75												
9         100         3         97         6.08         8.58         8.18         5.62         10.62         7.66         0.01         10.80           9         200         0         194         4.73         5.09         4.83         3.85         5.74         4.21         0.00         5.58           9         200         1         194         6.41         6.34         6.02         4.90         7.00         5.43         0.00         6.77           9         200         2         194         6.67         8.87         8.44         7.32         9.56         7.68         0.00         9.55           9         200         3         194         9.60         14.15         13.68         12.01         15.22         12.47         0.00         15.34           9         300         0         291         5.01         4.84         4.66         4.04         5.28         4.21         0.00         5.07           9         300         2         291         8.45         11.14         10.93         9.66         11.81         9.71         0.00         11.50           9         500         4.85         5.06         5.2		100		97	3.83	5.33	5.08		6.72	4.61	0.00	
9         200         0         194         4.73         5.09         4.83         3.85         5.74         4.21         0.00         5.58           9         200         1         194         5.41         6.34         6.02         4.90         7.00         5.43         0.00         6.77           9         200         2         194         6.77         8.87         8.44         7.32         9.56         7.68         0.00         9.55           9         200         3         194         9.60         14.15         13.68         12.01         15.22         12.47         0.00         15.34           9         300         0         291         5.75         6.56         6.27         5.47         7.07         5.56         0.00         6.87           9         300         2         291         8.45         11.14         10.93         9.66         11.81         9.71         0.00         11.50           9         300         3         291         13.97         21.27         21.12         19.43         22.18         19.27         0.01         22.17           9         500         1         485         5		100	2	97	4.85	7.08	6.39	4.31	8.48		0.00	7.93
9         200         1         194         5.41         6.34         6.02         4.90         7.00         5.43         0.00         6.77           9         200         2         194         6.77         8.87         8.44         7.32         9.56         7.68         0.00         9.55           9         200         3         194         9.60         14.15         13.68         12.01         15.22         12.47         0.00         15.34           9         300         0         291         5.01         4.84         4.66         4.04         5.28         4.21         0.00         5.07           9         300         1         291         5.75         6.56         6.27         5.47         7.07         5.56         0.00         6.87           9         300         2         291         8.45         11.14         10.93         9.66         11.81         9.71         0.00         11.50           9         300         2         485         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         485         5.06 <td>9</td> <td>100</td> <td>3</td> <td>97</td> <td>6.08</td> <td>8.58</td> <td>8.18</td> <td>5.62</td> <td>10.62</td> <td>7.66</td> <td>0.01</td> <td>10.80</td>	9	100	3	97	6.08	8.58	8.18	5.62	10.62	7.66	0.01	10.80
9         200         2         194         6.77         8.87         8.44         7.32         9.56         7.68         0.00         9.55           9         200         3         194         9.60         14.15         13.68         12.01         15.22         12.47         0.00         15.34           9         300         0         291         5.01         4.84         4.66         4.04         5.28         4.21         0.00         5.07           9         300         1         291         5.75         6.56         6.27         5.47         7.07         5.56         0.00         6.87           9         300         2         291         8.45         11.41         10.93         9.66         11.81         9.71         0.00         11.50           9         300         3         291         13.97         21.27         21.12         19.43         22.18         19.27         0.01         22.17           9         500         4.85         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         4.85         6.47			0									
9         200         3         194         9.60         14.15         13.68         12.01         15.22         12.47         0.00         15.34           9         300         0         291         5.01         4.84         4.66         4.04         5.28         4.21         0.00         5.07           9         300         1         291         5.75         6.56         6.27         5.47         7.07         5.56         0.00         6.87           9         300         2         291         8.45         11.14         10.93         9.66         11.81         9.71         0.00         11.50           9         300         3         291         13.97         21.27         21.12         19.43         22.18         19.27         0.01         22.17           9         500         0         485         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         485         6.47         7.14         7.18         6.66         7.51         5.98         0.00         7.37           9         500         2         485         2												
9         300         0         291         5.01         4.84         4.66         4.04         5.28         4.21         0.00         5.07           9         300         1         291         5.75         6.56         6.27         5.47         7.07         5.56         0.00         6.87           9         300         2         291         8.45         11.14         10.93         9.66         11.81         9.71         0.00         11.50           9         300         3         291         13.97         21.27         21.12         19.43         22.18         19.27         0.01         22.17           9         500         0         485         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         485         6.47         7.14         7.18         6.66         7.51         5.98         0.00         7.37           9         500         2         485         11.15         15.50         15.19         14.56         15.87         13.95         0.00         15.89           9         500         3         485												
9         300         1         291         5.75         6.56         6.27         5.47         7.07         5.56         0.00         6.87           9         300         2         291         8.45         11.14         10.93         9.66         11.81         9.71         0.00         11.50           9         300         3         291         13.97         21.27         21.12         19.43         22.18         19.27         0.01         22.17           9         500         0         485         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         485         6.47         7.14         7.18         6.66         7.51         5.98         0.00         7.37           9         500         2         485         11.15         15.50         15.19         14.56         15.87         13.95         0.00         15.89           9         500         3         485         20.81         33.91         33.87         32.73         34.44         31.50         0.03         34.50           9         750         0         728	9	200	3	194	9.60	14.15	13.68	12.01	15.22	12.47	0.00	15.34
9         300         2         291         8.45         11.14         10.93         9.66         11.81         9.71         0.00         11.50           9         300         3         291         13.97         21.27         21.12         19.43         22.18         19.27         0.01         22.17           9         500         0         485         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         485         6.47         7.14         7.18         6.66         7.51         5.98         0.00         7.37           9         500         2         485         11.15         15.50         15.19         14.56         15.87         13.95         0.00         15.89           9         500         3         485         20.81         33.91         33.87         32.73         34.44         31.50         0.03         34.50           9         750         0         728         5.19         5.20         5.07         4.91         5.32         4.44         0.00         5.27           9         750         1         727												
9         300         3         291         13.97         21.27         21.12         19.43         22.18         19.27         0.01         22.17           9         500         0         485         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         485         6.47         7.14         7.18         6.66         7.51         5.98         0.00         7.37           9         500         2         485         11.15         15.50         15.19         14.56         15.87         13.95         0.00         15.89           9         500         3         485         20.81         33.91         33.87         32.73         34.44         31.50         0.03         34.50           9         750         0         728         5.19         5.20         5.07         4.91         5.32         4.44         0.00         5.27           9         750         1         727         7.18         9.04         9.00         8.65         9.16         7.73         0.00         9.23           9         750         3         728         <												
9         500         0         485         5.06         5.29         5.13         4.75         5.45         4.44         0.00         5.45           9         500         1         485         6.47         7.14         7.18         6.66         7.51         5.98         0.00         7.37           9         500         2         485         11.15         15.50         15.19         14.56         15.87         13.95         0.00         15.89           9         500         3         485         20.81         33.91         33.87         32.73         34.44         31.50         0.03         34.50           9         750         0         728         5.19         5.20         5.07         4.91         5.32         4.44         0.00         5.27           9         750         1         727         7.18         9.04         9.00         8.65         9.16         7.73         0.00         9.23           9         750         2         728         14.27         21.72         21.67         20.87         22.07         19.49         0.00         22.26           9         750         3         728         <												
9         500         1         485         6.47         7.14         7.18         6.66         7.51         5.98         0.00         7.37           9         500         2         485         11.15         15.50         15.19         14.56         15.87         13.95         0.00         15.89           9         500         3         485         20.81         33.91         33.87         32.73         34.44         31.50         0.03         34.50           9         750         0         728         5.19         5.20         5.07         4.91         5.32         4.44         0.00         5.27           9         750         1         727         7.18         9.04         9.00         8.65         9.16         7.73         0.00         9.23           9         750         2         728         14.27         21.72         21.67         20.87         22.07         19.49         0.00         22.26           9         750         3         728         29.57         50.24         49.88         49.22         50.73         47.31         0.01         51.10           9         1000         0         970	9	300	3	291	13.97	21.27	21.12	19.43	22.18	19.27	0.01	22.17
9         500         2         485         11.15         15.50         15.19         14.56         15.87         13.95         0.00         15.89           9         500         3         485         20.81         33.91         33.87         32.73         34.44         31.50         0.03         34.50           9         750         0         728         5.19         5.20         5.07         4.91         5.32         4.44         0.00         5.27           9         750         1         727         7.18         9.04         9.00         8.65         9.16         7.73         0.00         9.23           9         750         2         728         14.27         21.72         21.67         20.87         22.07         19.49         0.00         22.26           9         750         3         728         29.57         50.24         49.88         49.22         50.73         47.31         0.01         51.10           9         1000         9.70         4.81         4.78         4.68         4.49         4.88         3.98         0.00         4.81           9         1000         2         9.70         18.67			0									
9         500         3         485         20.81         33.91         33.87         32.73         34.44         31.50         0.03         34.50           9         750         0         728         5.19         5.20         5.07         4.91         5.32         4.44         0.00         5.27           9         750         1         727         7.18         9.04         9.00         8.65         9.16         7.73         0.00         9.23           9         750         2         728         14.27         21.72         21.67         20.87         22.07         19.49         0.00         22.26           9         750         3         728         29.57         50.24         49.88         49.22         50.73         47.31         0.01         51.10           9         1000         0         970         4.81         4.78         4.68         4.49         4.88         3.98         0.00         4.81           9         1000         1         970         8.19         9.96         9.81         9.51         10.05         8.82         0.00         10.11           9         1000         2         970												
9         750         0         728         5.19         5.20         5.07         4.91         5.32         4.44         0.00         5.27           9         750         1         727         7.18         9.04         9.00         8.65         9.16         7.73         0.00         9.23           9         750         2         728         14.27         21.72         21.67         20.87         22.07         19.49         0.00         22.26           9         750         3         728         29.57         50.24         49.88         49.22         50.73         47.31         0.01         51.10           9         1000         0         970         4.81         4.78         4.68         4.49         4.88         3.98         0.00         4.81           9         1000         1         970         8.19         9.96         9.81         9.51         10.05         8.82         0.00         10.11           9         1000         2         970         18.67         30.34         30.30         29.79         30.70         28.10         0.00         31.17           9         1500         0         1455		500		485	11.15	15.50	15.19	14.56	15.87	13.95	0.00	15.89
9         750         1         727         7.18         9.04         9.00         8.65         9.16         7.73         0.00         9.23           9         750         2         728         14.27         21.72         21.67         20.87         22.07         19.49         0.00         22.26           9         750         3         728         29.57         50.24         49.88         49.22         50.73         47.31         0.01         51.10           9         1000         0         970         4.81         4.78         4.68         4.49         4.88         3.98         0.00         4.81           9         1000         1         970         8.19         9.96         9.81         9.51         10.05         8.82         0.00         10.11           9         1000         2         970         18.67         30.34         30.30         29.79         30.70         28.10         0.00         31.17           9         1000         3         970         40.08         65.29         65.23         64.66         65.64         62.48         0.08         66.36           9         1500         1         1455	9	500	3	485	20.81	33.91	33.87	32.73	34.44	31.50	0.03	34.50
9       750       2       728       14.27       21.72       21.67       20.87       22.07       19.49       0.00       22.26         9       750       3       728       29.57       50.24       49.88       49.22       50.73       47.31       0.01       51.10         9       1000       0       970       4.81       4.78       4.68       4.49       4.88       3.98       0.00       4.81         9       1000       1       970       8.19       9.96       9.81       9.51       10.05       8.82       0.00       10.11         9       1000       2       970       18.67       30.34       30.30       29.79       30.70       28.10       0.00       31.17         9       1000       3       970       40.08       65.29       65.23       64.66       65.64       62.48       0.08       66.36         9       1500       0       1455       5.21       5.23       5.32       5.22       5.20       4.48       0.00       5.23         9       1500       1       1455       9.08       11.91       11.90       11.68       12.10       10.64       0.00       12.			0							4.44		
9         750         3         728         29.57         50.24         49.88         49.22         50.73         47.31         0.01         51.10           9         1000         0         970         4.81         4.78         4.68         4.49         4.88         3.98         0.00         4.81           9         1000         1         970         8.19         9.96         9.81         9.51         10.05         8.82         0.00         10.11           9         1000         2         970         18.67         30.34         30.30         29.79         30.70         28.10         0.00         31.17           9         1000         3         970         40.08         65.29         65.23         64.66         65.64         62.48         0.08         66.36           9         1500         0         1455         5.21         5.23         5.32         5.22         5.20         4.48         0.00         5.23           9         1500         1         1455         9.08         11.91         11.90         11.68         12.10         10.64         0.00         12.09           9         1500         2         1												
9       1000       0       970       4.81       4.78       4.68       4.49       4.88       3.98       0.00       4.81         9       1000       1       970       8.19       9.96       9.81       9.51       10.05       8.82       0.00       10.11         9       1000       2       970       18.67       30.34       30.30       29.79       30.70       28.10       0.00       31.17         9       1000       3       970       40.08       65.29       65.23       64.66       65.64       62.48       0.08       66.36         9       1500       0       1455       5.21       5.23       5.32       5.22       5.20       4.48       0.00       5.23         9       1500       1       1455       9.08       11.91       11.90       11.68       12.10       10.64       0.00       12.09         9       1500       2       1455       26.16       43.78       43.85       43.37       43.79       40.70       0.00       44.65         9       1500       3       1455       58.57       85.21       85.14       84.96       85.41       83.64       0.24 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>												
9       1000       1       970       8.19       9.96       9.81       9.51       10.05       8.82       0.00       10.11         9       1000       2       970       18.67       30.34       30.30       29.79       30.70       28.10       0.00       31.17         9       1000       3       970       40.08       65.29       65.23       64.66       65.64       62.48       0.08       66.36         9       1500       0       1455       5.21       5.23       5.32       5.22       5.20       4.48       0.00       5.23         9       1500       1       1455       9.08       11.91       11.90       11.68       12.10       10.64       0.00       12.09         9       1500       2       1455       26.16       43.78       43.85       43.37       43.79       40.70       0.00       44.65         9       1500       3       1455       58.57       85.21       85.14       84.96       85.41       83.64       0.24       85.83         9       2000       0       1941       4.73       4.96       5.02       4.96       4.98       4.26       0.00       <	9	750	3	728	29.57	50.24	49.88	49.22	50.73	47.31	0.01	51.10
9       1000       2       970       18.67       30.34       30.30       29.79       30.70       28.10       0.00       31.17         9       1000       3       970       40.08       65.29       65.23       64.66       65.64       62.48       0.08       66.36         9       1500       0       1455       5.21       5.23       5.32       5.22       5.20       4.48       0.00       5.23         9       1500       1       1455       9.08       11.91       11.90       11.68       12.10       10.64       0.00       12.09         9       1500       2       1455       26.16       43.78       43.85       43.37       43.79       40.70       0.00       44.65         9       1500       3       1455       58.57       85.21       85.14       84.96       85.41       83.64       0.24       85.83         9       2000       0       1941       4.73       4.96       5.02       4.96       4.98       4.26       0.00       5.13         9       2000       1       1940       10.74       15.69       15.72       15.51       15.71       14.05       0.00			0						4.88			
9     1000     3     970     40.08     65.29     65.23     64.66     65.64     62.48     0.08     66.36       9     1500     0     1455     5.21     5.23     5.32     5.22     5.20     4.48     0.00     5.23       9     1500     1     1455     9.08     11.91     11.90     11.68     12.10     10.64     0.00     12.09       9     1500     2     1455     26.16     43.78     43.85     43.37     43.79     40.70     0.00     44.65       9     1500     3     1455     58.57     85.21     85.14     84.96     85.41     83.64     0.24     85.83       9     2000     0     1941     4.73     4.96     5.02     4.96     4.98     4.26     0.00     5.13       9     2000     1     1940     10.74     15.69     15.72     15.51     15.71     14.05     0.00     15.88       9     2000     2     1940     35.99     58.65     58.54     58.16     58.74     55.71     0.01     59.88		1000	1		8.19	9.96	9.81	9.51	10.05	8.82	0.00	10.11
9     1500     0     1455     5.21     5.23     5.32     5.22     5.20     4.48     0.00     5.23       9     1500     1     1455     9.08     11.91     11.90     11.68     12.10     10.64     0.00     12.09       9     1500     2     1455     26.16     43.78     43.85     43.37     43.79     40.70     0.00     44.65       9     1500     3     1455     58.57     85.21     85.14     84.96     85.41     83.64     0.24     85.83       9     2000     0     1941     4.73     4.96     5.02     4.96     4.98     4.26     0.00     5.13       9     2000     1     1940     10.74     15.69     15.72     15.51     15.71     14.05     0.00     15.88       9     2000     2     1940     35.99     58.65     58.54     58.16     58.74     55.71     0.01     59.88					18.67	30.34	30.30	29.79	30.70	28.10	0.00	31.17
9     1500     1     1455     9.08     11.91     11.90     11.68     12.10     10.64     0.00     12.09       9     1500     2     1455     26.16     43.78     43.85     43.37     43.79     40.70     0.00     44.65       9     1500     3     1455     58.57     85.21     85.14     84.96     85.41     83.64     0.24     85.83       9     2000     0     1941     4.73     4.96     5.02     4.96     4.98     4.26     0.00     5.13       9     2000     1     1940     10.74     15.69     15.72     15.51     15.71     14.05     0.00     15.88       9     2000     2     1940     35.99     58.65     58.54     58.16     58.74     55.71     0.01     59.88	9	1000	3	970	40.08	65.29	65.23	64.66	65.64	62.48	0.08	66.36
9     1500     2     1455     26.16     43.78     43.85     43.37     43.79     40.70     0.00     44.65       9     1500     3     1455     58.57     85.21     85.14     84.96     85.41     83.64     0.24     85.83       9     2000     0     1941     4.73     4.96     5.02     4.96     4.98     4.26     0.00     5.13       9     2000     1     1940     10.74     15.69     15.72     15.51     15.71     14.05     0.00     15.88       9     2000     2     1940     35.99     58.65     58.54     58.16     58.74     55.71     0.01     59.88	9		0	1455		5.23			5.20	4.48		5.23
9     1500     3     1455     58.57     85.21     85.14     84.96     85.41     83.64     0.24     85.83       9     2000     0     1941     4.73     4.96     5.02     4.96     4.98     4.26     0.00     5.13       9     2000     1     1940     10.74     15.69     15.72     15.51     15.71     14.05     0.00     15.88       9     2000     2     1940     35.99     58.65     58.54     58.16     58.74     55.71     0.01     59.88			1			11.91	11.90	11.68		10.64		12.09
9     2000     0     1941     4.73     4.96     5.02     4.96     4.98     4.26     0.00     5.13       9     2000     1     1940     10.74     15.69     15.72     15.51     15.71     14.05     0.00     15.88       9     2000     2     1940     35.99     58.65     58.54     58.16     58.74     55.71     0.01     59.88	9	1500	2	1455	26.16	43.78	43.85	43.37	43.79	40.70	0.00	44.65
9     2000     1     1940     10.74     15.69     15.72     15.51     15.71     14.05     0.00     15.88       9     2000     2     1940     35.99     58.65     58.54     58.16     58.74     55.71     0.01     59.88	9	1500	3	1455	58.57	85.21	85.14	84.96	85.41	83.64	0.24	85.83
9 2000 2 1940 35.99 58.65 58.54 58.16 58.74 55.71 0.01 59.88	9	2000	0	1941	4.73	4.96	5.02	4.96	4.98	4.26	0.00	5.13
	9	2000	1	1940	10.74	15.69	15.72	15.51		14.05	0.00	15.88
9 2000 3 1941 74.19 94.60 94.59 94.51 94.62 93.85 0.63 94.90	9	2000	2	1940	35.99	58.65	58.54	58.16	58.74	55.71	0.01	59.88
	9	2000	3	1941	74.19	94.60	94.59	94.51	94.62	93.85	0.63	94.90

Table 4: Observed power rates in percentages referring to scenarios of k = 11 items. The discrimination parameter of all items are drawn from  $U(1-.1\cdot d,1+.1\cdot d)$ . The assumed level of the tests is  $\alpha$  = 0.05.

k	$n_*$	d	$n_{inf}$	ALRT	Mod.LRT	Score	Wald	Gradient	rate_AIC	rate_BIC	Marg.LRT
11	100	0	98	4.20	4.87	4.56	2.88	6.22	2.93	0.00	5.91
11	100	1	98	4.34	5.34	4.91	2.97	6.79	3.14	0.00	6.49
11	100	2	98	4.65	7.22	6.69	4.47	9.15	4.44	0.00	8.42
11	100	3	98	6.98	11.13	10.40	7.25	13.43	7.15	0.00	12.73
11	200	0	196	4.81	5.13	4.87	3.92	5.87	2.85	0.00	5.57
11	200	1	196	5.35	6.21	5.96	4.94	7.05	3.91	0.00	6.69
11	200	2	196	8.39	10.88	10.41	8.75	12.16	7.01	0.00	11.91
11	200	3	196	13.47	21.00	20.27	17.61	22.39	14.77	0.00	21.88
11	300	0	294	5.17	4.76	4.49	3.93	5.23	2.85	0.00	5.30
11	300	1	294	6.29	7.34	7.03	6.17	7.94	4.69	0.00	7.66
11	300	2	294	10.61	14.95	14.40	13.10	15.81	10.40	0.00	15.33
11	300	3	294	19.12	30.41	30.19	28.09	31.71	22.99	0.00	31.53
11	500	0	490	5.30	5.18	5.03	4.61	5.44	3.04	0.00	5.21
11	500	1	490	7.09	8.44	8.20	7.67	8.72	5.49	0.00	8.53
11	500	2	490	15.04	22.81	22.69	21.64	23.43	16.53	0.00	23.52
11	500	3	490	31.39	52.57	52.27	50.88	53.24	43.69	0.01	53.48
11	750	0	736	5.46	4.85	4.79	4.51	4.99	2.82	0.00	5.09
11	750	1	736	8.40	11.13	11.13	10.61	11.45	7.30	0.00	11.56
11	750	2	735	21.68	34.69	34.54	33.72	35.14	27.07	0.00	35.17
11	750	3	736	48.96	73.34	73.29	72.46	73.70	65.90	0.03	74.53
11	1000	0	981	5.27	5.22	5.28	5.07	5.38	2.95	0.00	5.36
11	1000	1	981	9.25	13.14	13.07	12.55	13.56	8.59	0.00	13.40
11	1000	2	981	28.82	46.17	45.98	45.37	46.47	37.51	0.00	46.72
11	1000	3	981	63.07	87.42	87.30	86.88	87.48	82.14	0.08	87.91
11	1500	0	1471	5.16	5.11	5.15	4.99	5.24	3.05	0.00	5.33
11	1500	1	1471	12.28	17.70	17.54	17.19	17.83	12.56	0.00	17.78
11	1500	2	1471	43.13	67.77	67.65	67.20	68.02	59.24	0.00	68.15
11	1500	3	1471	84.32	97.75	97.72	97.68	97.78	96.44	0.55	97.86
11	2000	0	1962	4.79	5.00	5.02	4.92	5.10	2.77	0.00	5.08
11	2000	1	1961	14.78	23.67	23.51	23.24	23.82	17.06	0.00	23.80
11	2000	2	1961	57.60	82.72	82.65	82.46	82.76	76.54	0.01	82.80
11	2000	3	1962	94.04	99.66	99.70	99.68	99.66	99.42	2.85	99.74

Table 5: Observed power rates in percentages referring to scenarios of k = 15 items. The discrimination parameter of all items are drawn from  $U(1-.1\cdot d,1+.1\cdot d)$ . The assumed level of the tests is  $\alpha$  = 0.05.

k	$n_*$	d	$n_{inf}$	ALRT	Mod.LRT	Score	Wald	Gradient	rate_AIC	rate_BIC	Marg.LRT
15	100	0	99	4.53	5.06	4.55	3.01	6.31	1.69	0.00	5.73
15	100	1	99	5.14	6.47	5.89	3.71	8.38	2.18	0.00	7.17
15	100	2	99	7.29	10.36	9.55	6.56	12.59	3.55	0.00	11.26
15	200	0	198	5.15	5.19	4.97	4.05	5.88	1.61	0.00	5.88
15	200	1	198	6.88	7.83	7.37	5.89	8.73	2.41	0.00	8.21
15	200	2	198	11.34	16.54	15.84	13.72	18.00	7.01	0.00	17.69
15	300	0	297	5.36	5.66	5.20	4.54	6.07	1.48	0.00	5.62
15	300	1	297	7.20	8.34	8.19	7.19	9.29	3.00	0.00	9.03
15	300	2	297	16.26	24.48	23.71	22.04	25.73	11.60	0.00	25.44
15	500	0	495	4.75	4.74	4.69	4.31	5.00	1.21	0.00	4.89
15	500	1	494	8.68	11.19	10.99	10.23	11.62	4.02	0.00	11.48
15	500	2	495	25.44	40.33	39.83	38.48	41.15	23.03	0.00	40.82
15	750	0	742	5.08	5.08	4.93	4.72	5.34	1.42	0.00	5.06
15	750	1	742	11.04	15.69	15.61	14.97	16.07	6.12	0.00	15.83
15	750	2	742	38.21	60.51	60.38	59.41	60.85	40.93	0.00	61.33
15	1000	0	989	5.40	5.09	5.18	4.98	5.29	1.46	0.00	4.96
15	1000	1	989	13.27	20.39	20.05	19.64	20.71	8.51	0.00	20.32
15	1000	2	989	51.39	76.70	76.50	76.06	76.77	59.44	0.01	77.27
15	1500	0	1484	5.23	5.22	5.22	5.14	5.32	1.50	0.00	5.23
15	1500	1	1484	19.44	30.57	30.54	30.07	30.71	15.38	0.00	31.13
15	1500	2	1484	73.69	93.51	93.51	93.36	93.56	85.73	0.01	93.99
15	2000	0	1978	5.13	5.05	4.94	4.88	5.11	1.51	0.00	5.05
15	2000	1	1978	25.45	40.93	40.85	40.62	41.17	22.93	0.00	41.53
15	2000	2	1978	87.77	98.79	98.80	98.78	98.77	95.80	0.02	98.89

Table 6: Observed power rates in percentages referring to scenarios of k = 21 items. The discrimination parameter of all items are drawn from  $U(1-.1\cdot d,1+.1\cdot d)$ . The assumed level of the tests is  $\alpha$  = 0.05.

k	$n_*$	d	$n_{inf}$	ALRT	Mod.LRT	Score	Wald	Gradient	rate_AIC	rate_BIC	Marg.LRT
21	100	0	100	5.27	5.90	5.26	3.05	7.68	0.60	0.00	6.40
21	100	1	100	5.76	7.01	6.23	3.81	8.76	0.79	0.00	7.63
21	100	2	99	8.96	11.73	10.91	7.20	14.28	2.05	0.00	12.75
21	200	0	199	5.40	5.57	5.28	4.00	6.35	0.58	0.00	6.04
21	200	1	199	6.97	8.17	7.79	6.30	9.31	0.99	0.00	8.79
21	200	2	199	12.55	18.06	17.70	15.29	19.50	3.30	0.00	18.90
21	300	0	299	5.53	5.38	5.11	4.46	5.87	0.57	0.00	5.58
21	300	1	298	8.20	9.51	9.16	8.13	10.06	1.48	0.00	9.52
21	300	2	298	18.01	27.18	26.71	24.57	28.26	6.70	0.00	27.34
21	500	0	497	5.35	5.40	5.36	4.88	5.58	0.60	0.00	5.42
21	500	1	497	10.06	12.31	12.14	11.37	12.94	1.92	0.00	12.68
21	500	2	497	28.58	46.11	45.92	44.35	46.70	17.73	0.00	46.19
21	750	0	746	5.28	5.11	5.04	4.67	5.26	0.59	0.00	5.19
21	750	1	746	11.90	17.31	17.21	16.59	17.61	3.24	0.00	17.32
21	750	2	746	43.89	68.42	68.47	67.64	68.73	36.35	0.00	68.63
21	1000	0	995	5.10	4.82	4.74	4.52	4.94	0.43	0.00	4.95
21	1000	1	995	14.35	21.82	21.67	21.19	22.26	4.63	0.00	22.16
21	1000	2	995	59.04	83.39	83.28	82.89	83.54	55.73	0.00	83.87
21	1500	0	1493	4.95	4.98	5.04	4.95	5.14	0.55	0.00	5.12
21	1500	1	1492	20.40	33.10	33.15	32.67	33.46	9.85	0.00	33.30
21	1500	2	1492	81.71	96.84	96.81	96.76	96.85	85.29	0.00	96.85
21	2000	0	1990	5.19	4.80	4.80	4.74	4.88	0.45	0.00	4.93
21	2000	1	1990	28.35	46.24	46.08	45.75	46.31	16.33	0.00	46.26
21	2000	2	1990	93.61	99.64	99.63	99.63	99.62	96.70	0.00	99.68

Table 7: Observed power rates in percentages referring to scenarios of k = 31 items. The discrimination parameter of all items are drawn from  $U(1-.1\cdot d,1+.1\cdot d)$ . The assumed level of the tests is  $\alpha$  = 0.05.

k	$n_*$	d	$n_{inf}$	ALRT	Mod.LRT	Score	Wald	Gradient	rate_AIC	rate_BIC	Marg.LRT
31	100	0	100	4.95	5.89	5.18	3.08	8.06	0.11	0.00	6.44
31	100	1	100	6.33	7.39	6.43	3.64	9.71	0.22	0.00	7.74
31	100	2	100	8.20	11.89	10.72	6.67	15.12	0.45	0.00	12.57
31	200	0	200	5.46	5.62	5.09	3.88	6.46	0.05	0.00	5.86
31	200	1	200	7.59	8.40	7.96	6.27	9.65	0.17	0.00	8.58
31	200	2	200	14.19	21.80	20.68	17.33	23.52	1.25	0.00	22.50
31	300	0	300	5.57	5.47	5.15	4.21	6.07	0.11	0.00	5.66
31	300	1	300	8.11	9.39	8.98	7.69	10.30	0.29	0.00	9.78
31	300	2	300	19.82	31.28	30.70	28.35	32.70	3.25	0.00	31.73
31	500	0	499	5.30	5.55	5.45	5.00	5.95	0.11	0.00	5.44
31	500	1	499	9.27	13.01	12.89	11.90	13.59	0.62	0.00	13.17
31	500	2	499	32.42	53.52	53.32	51.63	54.23	10.46	0.00	54.07
31	750	0	749	5.22	4.95	4.73	4.48	5.16	0.09	0.00	5.00
31	750	1	749	12.41	18.21	18.09	17.25	18.64	1.15	0.00	18.37
31	750	2	749	50.16	76.35	76.53	75.60	76.57	26.87	0.00	76.82
31	1000	0	999	5.11	4.74	4.61	4.32	5.03	0.07	0.00	4.83
31	1000	1	999	15.87	24.62	24.77	23.98	24.91	1.88	0.00	24.90
31	1000	2	998	65.30	89.87	90.06	89.71	90.06	50.16	0.00	90.31
31	1500	0	1498	5.49	5.02	5.04	4.85	5.17	0.04	0.00	5.06
31	1500	1	1498	23.03	38.06	38.12	37.69	38.22	4.81	0.00	38.61
31	1500	2	1498	87.60	99.07	99.08	99.01	99.08	84.65	0.00	99.09
31	2000	0	1997	4.66	4.84	4.83	4.73	4.90	0.05	0.00	4.86
31	2000	1	1997	31.95	52.21	52.26	52.04	52.42	9.89	0.00	52.83
31	2000	2	1997	96.40	99.94	99.94	99.94	99.94	97.14	0.00	99.95