DIF Investigation

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DIF Analyses

Uniform DIF LR-LRT

```
##
## Detection of uniform Differential Item Functioning
## using Logistic regression method, without item purification
## and with LRT DIF statistic
##
## Matching variable: test score
##
## No set of anchor items was provided
##
## No p-value adjustment for multiple comparisons
##
## Logistic regression DIF statistic:
##
##      Stat.  P-value
## E1a  4.2271 0.0398  *
## E2a  5.0153 0.0251  *
## E3a  3.8976 0.0484  *
## E4a  3.4787 0.0622  .
## E5a  2.0167 0.1556
## E6a  2.3584 0.1246
## E7a  0.2278 0.6332
## E8a  9.1632 0.0025  **
## E9a  0.6050 0.4367
## E10a 3.6937 0.0546  .
##
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Detection threshold: 3.8415 (significance level: 0.05)
##
## Items detected as uniform DIF items:
##
##  E1a
##  E2a
##  E3a
##  E8a
##
##
## Effect size (Nagelkerke's R^2):
##
## Effect size code:
##  'A': negligible effect
##  'B': moderate effect
```

```
##  'C': large effect
##
##      R^2 ZT JG
## E1a  0   A  A
## E2a  0   A  A
## E3a  0   A  A
## E4a  0   A  A
## E5a  0   A  A
## E6a  0   A  A
## E7a  0   A  A
## E8a  0   A  A
## E9a  0   A  A
## E10a 0   A  A
##
## Effect size codes:
##  Zumbo & Thomas (ZT): 0 'A' 0.13 'B' 0.26 'C' 1
##  Jodoin & Gierl (JG): 0 'A' 0.035 'B' 0.07 'C' 1
##
##  Output was not captured!
```

Combined DIF LR-LRT

```
##
## Detection of both types of Differential Item Functioning
## using Logistic regression method, without item purification
## and with LRT DIF statistic
##
## Matching variable: test score
##
## No set of anchor items was provided
##
## No p-value adjustment for multiple comparisons
##
## Logistic regression DIF statistic:
##
##      Stat.   P-value
## E1a   4.7275  0.0941 .
## E2a  12.5405  0.0019 **
## E3a  10.4180  0.0055 **
## E4a   4.0638  0.1311
## E5a   4.5242  0.1041
## E6a   6.3359  0.0421 *
## E7a   2.2904  0.3182
## E8a  10.2141  0.0061 **
## E9a   2.6466  0.2663
## E10a  5.7011  0.0578 .
##
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Detection threshold: 5.9915 (significance level: 0.05)
##
## Items detected as DIF items:
##
##  E2a
##  E3a
##  E6a
##  E8a
##
##
## Effect size (Nagelkerke's R^2):
##
## Effect size code:
##  'A': negligible effect
##  'B': moderate effect
##  'C': large effect
##
##      R^2 ZT JG
## E1a  0   A  A
## E2a  0   A  A
## E3a  0   A  A
## E4a  0   A  A
## E5a  0   A  A
## E6a  0   A  A
## E7a  0   A  A
```

```
## E8a  0   A  A
## E9a  0   A  A
## E10a 0   A  A
##
## Effect size codes:
##  Zumbo & Thomas (ZT): 0 'A' 0.13 'B' 0.26 'C' 1
##  Jodoin & Gierl (JG): 0 'A' 0.035 'B' 0.07 'C' 1
##
##  Output was not captured!
```

MH DIF

```
##
## Detection of Differential Item Functioning using Mantel-Haenszel method
## with continuity correction and without item purification
##
## Results based on asymptotic inference
##
## Matching variable: test score
##
## No set of anchor items was provided
##
## No p-value adjustment for multiple comparisons
##
## Mantel-Haenszel Chi-square statistic:
##
##      Stat.  P-value
## E1a  2.6566 0.1031
## E2a  6.3079 0.0120  *
## E3a  5.2486 0.0220  *
## E4a  2.3418 0.1259
## E5a  2.8175 0.0932  .
## E6a  3.2107 0.0732  .
## E7a  0.0357 0.8501
## E8a  7.2589 0.0071  **
## E9a  0.2431 0.6220
## E10a 2.4860 0.1149
##
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Detection threshold: 3.8415 (significance level: 0.05)
##
## Items detected as DIF items:
##
##  E2a
##  E3a
##  E8a
##
##
## Effect size (ETS Delta scale):
##
## Effect size code:
##  'A': negligible effect
##  'B': moderate effect
##  'C': large effect
##
##      alphaMH deltaMH
## E1a   0.9416  0.1413 A
## E2a   1.1035 -0.2315 A
## E3a   1.0918 -0.2063 A
## E4a   0.9418  0.1408 A
## E5a   1.0709 -0.1610 A
## E6a   1.0782 -0.1770 A
## E7a   0.9910  0.0212 A
```

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## E8a   0.8992  0.2497 A
## E9a   0.9787  0.0505 A
## E10a  0.9357  0.1563 A
##
## Effect size codes: 0 'A' 1.0 'B' 1.5 'C'
##  (for absolute values of 'deltaMH')
##
## Output was not captured!
```