

**Report on the statistical analysis conducted for 2017 annual data
National Exercise and Sports Trainers Association (NESTA)
Personal Fitness Trainer (PFT) Certification Exam**



January 2018

PSI Services LLC

Summary of Scale-Level Statistics

In 2016, the National Exercise and Sports Trainers Association (NESTA) Personal Fitness Trainer (PFT) certification examination has been administered via FormCast™, PSI's linear on-the-fly testing (LOFT) algorithm. The examination administered via FormCast™ is assembled according to an updated examination content outline, as compared to the two fixed forms. See table 1 for a summary of scale-level characteristics of the PFT examination administered in 2017.

Table 1

Scale-level characteristics of the PFT examination

| Exam Form | n | k | Raw Cut | Mean Score | SD | Alpha | SEM | DC | Pass Rate |
|----------------|-----|-----|---------|------------|-------|-------|------|------|-----------|
| FormCast™ LOFT | 724 | 100 | 69 | 73.55 | 10.66 | 0.95 | 5.97 | 0.95 | 70.72% |

n represents the number of exam candidates for each section. *k* represents the number of scored items in the exam. The raw cut is the minimum number of items a candidate must answer correctly to achieve passing score. The mean score is the average of candidates' score. SD is the standard deviation of candidates' scores, which is a measure of average dispersion of candidates' scores. Alpha represents Cronbach's alpha reliability estimate of the scale, which is a measure of consistency among candidates' responses to items. SEM is the standard error of measurement, which is a measure of the confidence interval around a given candidate's true score, which represents the average amount of variation associated with factors other than ability. DC represents the Livingston-Lewis Decision Consistency Index, which is an estimate of the consistency of pass-fail decisions across multiple hypothetical administrations. The pass rate is the percentage of first-time test candidates who achieved a passing decision outcome. All information presented is on a raw scale.

Although not used for the determination of candidate scores, subscale (content domain) information is provided to failing candidates for self-diagnostic purposes. See table 2 for a summary of subscale-level characteristics of the PFT examination administered in 2017.

Table 2

Subscale-level characteristics of the PFT examination

| Content Domain | <i>k</i> | Mean Score | SD | Min Score | Max Score | Alpha |
|----------------------|----------|------------|------|-----------|-----------|-------|
| Assessment | 18 | 13.42 | 2.42 | 5 | 18 | 0.79 |
| Business Application | 20 | 16.49 | 2.34 | 7 | 20 | 0.64 |
| Exercise Application | 10 | 6.86 | 1.83 | 1 | 10 | 0.94 |
| Exercise Psychology | 11 | 8.20 | 1.71 | 2 | 11 | 0.45 |
| Exercise Science | 15 | 9.68 | 2.64 | 1 | 15 | 0.89 |
| Nutrition | 10 | 7.15 | 1.80 | 1 | 10 | 0.95 |
| Program Design | 16 | 11.76 | 2.42 | 4 | 16 | 0.82 |

Summary of Item-Level Statistics

A p value is a sample-dependent measure of item difficulty, ranging from 0.00 to 1.00 with higher values representing easier items. This statistic can be interpreted as the percentage of candidates who answered the item correctly. A point-biserial correlation is a sample-dependent measure of an item's capacity to differentiate between higher- and lower-ability candidates. This statistic ranges from -1.00 to 1.00, with higher values reflecting that higher-scoring candidates answered the item correctly more often than lower-scoring candidates. The acceptable range of difficulty levels for a four-option multiple choice item typically ranges from 0.25 to 0.95 and the acceptable range of discrimination levels for an item typically ranges from 0.10 and above.¹

See table 3 for a summary of item-level statistics of the PFT examination administered via FormCast™ in 2017.

Table 3
Item-level characteristics of the PFT examination

| Item ID | Status | n | $pval$ | r_{pb} |
|----------|--------|-----|--------|----------|
| PFT00002 | Scored | 335 | 0.77 | 0.16 |
| PFT00003 | Scored | 353 | 0.96 | 0.22 |
| PFT00004 | Scored | 331 | 0.86 | 0.40 |
| PFT00008 | Scored | 340 | 0.64 | 0.27 |
| PFT00011 | Scored | 311 | 0.68 | 0.41 |
| PFT00014 | Scored | 333 | 0.77 | 0.40 |
| PFT00017 | Scored | 309 | 0.42 | 0.16 |
| PFT00021 | Scored | 310 | 0.60 | 0.46 |
| PFT00022 | Scored | 325 | 0.71 | 0.26 |
| PFT00025 | Scored | 364 | 0.88 | 0.27 |
| PFT00026 | Scored | 361 | 0.75 | 0.23 |
| PFT00028 | Scored | 354 | 0.88 | 0.43 |
| PFT00030 | Scored | 337 | 0.74 | 0.38 |
| PFT00032 | Scored | 235 | 0.53 | 0.22 |
| PFT00033 | Scored | 349 | 0.90 | 0.23 |
| PFT00038 | Scored | 337 | 0.72 | 0.11 |
| PFT00041 | Scored | 393 | 0.90 | 0.28 |
| PFT00044 | Scored | 365 | 0.92 | 0.17 |
| PFT00045 | Scored | 327 | 0.59 | 0.18 |
| PFT00047 | Scored | 310 | 0.67 | 0.42 |
| PFT00048 | Scored | 292 | 0.90 | 0.12 |
| PFT00049 | Scored | 328 | 0.70 | 0.02 |

¹ Anastasi, A., Urbina, S. (2009). Psychological Testing, 7th Edition. Upper Saddle River (NJ): Prentice Hall.

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|----------|--------|-----|------|-------|
| PFT00051 | Scored | 332 | 0.56 | 0.13 |
| PFT00054 | Scored | 319 | 0.66 | 0.33 |
| PFT00055 | Scored | 272 | 0.86 | 0.19 |
| PFT00057 | Scored | 319 | 0.70 | 0.35 |
| PFT00058 | Scored | 250 | 0.44 | 0.09 |
| PFT00060 | Scored | 314 | 0.32 | 0.16 |
| PFT00063 | Scored | 319 | 0.84 | 0.25 |
| PFT00064 | Scored | 335 | 0.72 | 0.14 |
| PFT00065 | Scored | 295 | 0.50 | 0.08 |
| PFT00066 | Scored | 256 | 0.77 | 0.37 |
| PFT00069 | Scored | 354 | 0.93 | 0.27 |
| PFT00070 | Scored | 345 | 0.87 | 0.35 |
| PFT00072 | Scored | 347 | 0.90 | 0.13 |
| PFT00073 | Scored | 260 | 0.78 | 0.45 |
| PFT00075 | Scored | 336 | 0.67 | 0.16 |
| PFT00079 | Scored | 297 | 0.58 | 0.35 |
| PFT00080 | Scored | 334 | 0.87 | 0.25 |
| PFT00085 | Scored | 258 | 0.66 | 0.53 |
| PFT00095 | Scored | 245 | 0.88 | 0.35 |
| PFT00097 | Scored | 597 | 0.57 | 0.17 |
| PFT00098 | Scored | 634 | 0.96 | 0.22 |
| PFT00101 | Scored | 607 | 0.82 | 0.43 |
| PFT00103 | Scored | 621 | 0.82 | 0.30 |
| PFT00105 | Scored | 630 | 0.91 | 0.29 |
| PFT00107 | Scored | 626 | 0.92 | 0.28 |
| PFT00108 | Scored | 619 | 0.89 | 0.20 |
| PFT00110 | Scored | 91 | 0.90 | -0.04 |
| PFT00113 | Scored | 621 | 0.94 | 0.30 |
| PFT00118 | Scored | 616 | 0.63 | 0.09 |
| PFT00120 | Scored | 621 | 0.92 | 0.18 |
| PFT00121 | Scored | 86 | 0.97 | 0.26 |
| PFT00126 | Scored | 622 | 0.68 | 0.25 |
| PFT00127 | Scored | 623 | 0.86 | 0.25 |
| PFT00129 | Scored | 630 | 0.95 | 0.07 |
| PFT00131 | Scored | 615 | 0.78 | 0.29 |
| PFT00132 | Scored | 614 | 0.85 | 0.33 |
| PFT00133 | Scored | 614 | 0.81 | 0.16 |
| PFT00134 | Scored | 229 | 0.65 | 0.40 |
| PFT00137 | Scored | 284 | 0.71 | 0.42 |
| PFT00138 | Scored | 268 | 0.65 | 0.42 |
| PFT00139 | Scored | 270 | 0.86 | 0.46 |
| PFT00145 | Scored | 269 | 0.66 | 0.27 |
| PFT00147 | Scored | 252 | 0.43 | 0.13 |

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|----------|--------|-----|------|------|
| PFT00149 | Scored | 247 | 0.52 | 0.19 |
| PFT00150 | Scored | 242 | 0.27 | 0.07 |
| PFT00154 | Scored | 282 | 0.73 | 0.46 |
| PFT00155 | Scored | 287 | 0.38 | 0.11 |
| PFT00156 | Scored | 234 | 0.51 | 0.28 |
| PFT00157 | Scored | 251 | 0.65 | 0.39 |
| PFT00158 | Scored | 286 | 0.92 | 0.32 |
| PFT00160 | Scored | 249 | 0.58 | 0.16 |
| PFT00161 | Scored | 268 | 0.63 | 0.26 |
| PFT00162 | Scored | 348 | 0.91 | 0.42 |
| PFT00163 | Scored | 234 | 0.49 | 0.13 |
| PFT00167 | Scored | 352 | 0.85 | 0.17 |
| PFT00168 | Scored | 331 | 0.75 | 0.23 |
| PFT00172 | Scored | 338 | 0.95 | 0.32 |
| PFT00176 | Scored | 351 | 0.71 | 0.21 |
| PFT00177 | Scored | 340 | 0.78 | 0.37 |
| PFT00180 | Scored | 342 | 0.97 | 0.16 |
| PFT00182 | Scored | 274 | 0.91 | 0.31 |
| PFT00183 | Scored | 258 | 0.83 | 0.46 |
| PFT00185 | Scored | 192 | 0.74 | 0.26 |
| PFT00186 | Scored | 182 | 0.67 | 0.45 |
| PFT00187 | Scored | 203 | 0.83 | 0.13 |
| PFT00189 | Scored | 298 | 0.73 | 0.17 |
| PFT00191 | Scored | 170 | 0.59 | 0.38 |
| PFT00192 | Scored | 173 | 0.67 | 0.19 |
| PFT00194 | Scored | 167 | 0.77 | 0.13 |
| PFT00196 | Scored | 181 | 0.81 | 0.47 |
| PFT00197 | Scored | 178 | 0.70 | 0.21 |
| PFT00198 | Scored | 252 | 0.83 | 0.32 |
| PFT00199 | Scored | 183 | 0.90 | 0.34 |
| PFT00200 | Scored | 271 | 0.73 | 0.29 |
| PFT00201 | Scored | 162 | 0.45 | 0.38 |
| PFT00202 | Scored | 164 | 0.66 | 0.50 |
| PFT00203 | Scored | 185 | 0.88 | 0.15 |
| PFT00204 | Scored | 141 | 0.39 | 0.18 |
| PFT00205 | Scored | 207 | 0.87 | 0.16 |
| PFT00206 | Scored | 189 | 0.90 | 0.16 |
| PFT00208 | Scored | 189 | 0.89 | 0.08 |
| PFT00209 | Scored | 167 | 0.72 | 0.28 |
| PFT00210 | Scored | 172 | 0.51 | 0.31 |
| PFT00212 | Scored | 165 | 0.62 | 0.39 |
| PFT00213 | Scored | 191 | 0.90 | 0.29 |
| PFT00215 | Scored | 226 | 0.54 | 0.29 |

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|----------|--------|-----|------|------|
| PFT00218 | Scored | 180 | 0.68 | 0.38 |
| PFT00220 | Scored | 186 | 0.70 | 0.34 |
| PFT00221 | Scored | 244 | 0.54 | 0.35 |
| PFT00222 | Scored | 141 | 0.48 | 0.29 |
| PFT00224 | Scored | 173 | 0.49 | 0.12 |
| PFT00226 | Scored | 186 | 0.59 | 0.27 |
| PFT00227 | Scored | 156 | 0.40 | 0.12 |
| PFT00228 | Scored | 174 | 0.57 | 0.12 |
| PFT00234 | Scored | 185 | 0.63 | 0.31 |
| PFT00241 | Scored | 163 | 0.63 | 0.28 |
| PFT00248 | Scored | 173 | 0.66 | 0.23 |
| PFT00253 | Scored | 292 | 0.81 | 0.25 |
| PFT00263 | Scored | 192 | 0.54 | 0.16 |
| PFT00266 | Scored | 199 | 0.87 | 0.13 |
| PFT00267 | Scored | 168 | 0.50 | 0.23 |
| PFT00269 | Scored | 177 | 0.75 | 0.33 |
| PFT00270 | Scored | 171 | 0.81 | 0.40 |
| PFT00275 | Scored | 195 | 0.71 | 0.29 |
| PFT00276 | Scored | 233 | 0.50 | 0.50 |
| PFT00279 | Scored | 156 | 0.48 | 0.47 |
| PFT00282 | Scored | 258 | 0.86 | 0.34 |
| PFT00283 | Scored | 240 | 0.81 | 0.28 |
| PFT00284 | Scored | 266 | 0.85 | 0.12 |
| PFT00285 | Scored | 244 | 0.87 | 0.21 |
| PFT00286 | Scored | 270 | 0.83 | 0.27 |
| PFT00288 | Scored | 234 | 0.82 | 0.41 |
| PFT00290 | Scored | 208 | 0.63 | 0.30 |
| PFT00292 | Scored | 238 | 0.72 | 0.11 |
| PFT00295 | Scored | 245 | 0.83 | 0.35 |
| PFT00301 | Scored | 231 | 0.60 | 0.22 |
| PFT00306 | Scored | 253 | 0.52 | 0.37 |
| PFT00307 | Scored | 261 | 0.87 | 0.42 |
| PFT00309 | Scored | 301 | 0.87 | 0.25 |
| PFT00311 | Scored | 295 | 0.40 | 0.32 |
| PFT00313 | Scored | 313 | 0.66 | 0.19 |
| PFT00314 | Scored | 318 | 0.58 | 0.26 |
| PFT00320 | Scored | 301 | 0.89 | 0.33 |
| PFT00321 | Scored | 302 | 0.75 | 0.50 |
| PFT00326 | Scored | 345 | 0.95 | 0.23 |
| PFT00328 | Scored | 337 | 0.95 | 0.30 |
| PFT00336 | Scored | 306 | 0.67 | 0.17 |
| PFT00337 | Scored | 302 | 0.92 | 0.27 |
| PFT00338 | Scored | 355 | 0.87 | 0.32 |

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|----------|--------|-----|------|-------|
| PFT00339 | Scored | 338 | 0.79 | 0.18 |
| PFT00344 | Scored | 342 | 0.79 | 0.40 |
| PFT00353 | Scored | 336 | 0.83 | 0.29 |
| PFT00354 | Scored | 269 | 0.40 | 0.25 |
| PFT00355 | Scored | 350 | 0.90 | 0.41 |
| PFT00361 | Scored | 304 | 0.69 | 0.18 |
| PFT00370 | Scored | 252 | 0.56 | 0.25 |
| PFT00372 | Scored | 246 | 0.48 | 0.35 |
| PFT00376 | Scored | 256 | 0.48 | 0.20 |
| PFT00383 | Scored | 256 | 0.65 | 0.29 |
| PFT00392 | Scored | 236 | 0.53 | 0.34 |
| PFT77058 | Scored | 31 | 0.94 | -0.15 |
| PFT77061 | Scored | 606 | 0.83 | 0.29 |
| PFT77079 | Scored | 20 | 0.50 | 0.62 |
| PFT77092 | Scored | 18 | 0.50 | 0.05 |
| PFT77103 | Scored | 724 | 0.78 | 0.36 |
| PFT77113 | Scored | 724 | 0.84 | 0.32 |
| PFT77114 | Scored | 724 | 0.83 | 0.26 |
| PFT77115 | Scored | 722 | 0.65 | 0.14 |
| PFT77154 | Scored | 723 | 0.89 | 0.06 |
| PFT77155 | Scored | 723 | 0.95 | 0.15 |
| PFT77163 | Scored | 241 | 0.78 | 0.32 |
| PFT77168 | Scored | 84 | 0.86 | 0.46 |
| PFT77206 | Scored | 22 | 0.64 | 0.32 |
| PFT77208 | Scored | 29 | 0.90 | 0.46 |
| PFT77213 | Scored | 723 | 0.67 | 0.39 |
| PFT77220 | Scored | 634 | 0.96 | 0.11 |
| PFT77221 | Scored | 722 | 0.82 | 0.32 |
| PFT77614 | Scored | 26 | 0.81 | 0.29 |
| PFT77615 | Scored | 22 | 0.68 | 0.23 |
| PFT77616 | Scored | 20 | 0.60 | 0.40 |
| PFT77618 | Scored | 26 | 0.81 | 0.43 |
| PFT77629 | Scored | 605 | 0.73 | 0.30 |
| PFT77676 | Scored | 23 | 0.39 | 0.37 |
| PFT77677 | Scored | 33 | 0.67 | 0.46 |
| PFT77678 | Scored | 19 | 0.32 | -0.20 |
| PFT77680 | Scored | 32 | 0.50 | 0.42 |
| PFT77686 | Scored | 616 | 0.71 | 0.17 |
| PFT77696 | Scored | 628 | 0.97 | 0.18 |
| PFT77703 | Scored | 723 | 0.25 | 0.13 |
| PFT77801 | Scored | 209 | 0.53 | 0.19 |
| PFT77802 | Scored | 237 | 0.62 | 0.31 |
| PFT77803 | Scored | 321 | 0.45 | 0.14 |

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|----------|--------|-----|------|------|
| PFT77804 | Scored | 325 | 0.75 | 0.35 |
| PFT77806 | Scored | 723 | 0.88 | 0.35 |
| PFT77807 | Scored | 256 | 0.92 | 0.19 |
| PFT77808 | Scored | 331 | 0.69 | 0.24 |
| PFT77809 | Scored | 347 | 0.82 | 0.20 |
| PFT77811 | Scored | 268 | 0.62 | 0.28 |
| PFT77812 | Scored | 341 | 0.82 | 0.09 |
| PFT77814 | Scored | 197 | 0.35 | 0.17 |
| PFT77816 | Scored | 240 | 0.66 | 0.30 |
| PFT77817 | Scored | 251 | 0.82 | 0.27 |
| PFT77818 | Scored | 256 | 0.80 | 0.34 |
| PFT77819 | Scored | 372 | 0.89 | 0.10 |
| PFT77820 | Scored | 267 | 0.81 | 0.33 |
| PFT77821 | Scored | 239 | 0.68 | 0.19 |
| PFT77822 | Scored | 169 | 0.75 | 0.39 |
| PFT77823 | Scored | 260 | 0.54 | 0.21 |
| PFT77824 | Scored | 281 | 0.68 | 0.47 |
| PFT77825 | Scored | 188 | 0.89 | 0.16 |
| PFT77827 | Scored | 724 | 0.65 | 0.21 |
| PFT77830 | Scored | 316 | 0.49 | 0.19 |
| PFT77832 | Scored | 201 | 0.37 | 0.49 |
| PFT77833 | Scored | 222 | 0.51 | 0.44 |
| PFT77834 | Scored | 307 | 0.61 | 0.34 |
| PFT77835 | Scored | 315 | 0.74 | 0.33 |
| PFT77836 | Scored | 245 | 0.66 | 0.31 |
| PFT77837 | Scored | 226 | 0.60 | 0.22 |
| PFT77838 | Scored | 315 | 0.62 | 0.40 |
| PFT77840 | Scored | 179 | 0.70 | 0.31 |
| PFT77841 | Scored | 257 | 0.67 | 0.30 |
| PFT77842 | Scored | 228 | 0.50 | 0.38 |
| PFT77844 | Scored | 162 | 0.50 | 0.30 |
| PFT77846 | Scored | 307 | 0.60 | 0.06 |
| PFT77847 | Scored | 317 | 0.79 | 0.49 |
| PFT77848 | Scored | 319 | 0.49 | 0.31 |
| PFT77849 | Scored | 237 | 0.59 | 0.41 |
| PFT77850 | Scored | 236 | 0.72 | 0.26 |
| PFT77852 | Scored | 288 | 0.41 | 0.18 |
| PFT77853 | Scored | 324 | 0.70 | 0.15 |
| PFT77854 | Scored | 608 | 0.76 | 0.22 |
| PFT77855 | Scored | 320 | 0.94 | 0.30 |
| PFT77856 | Scored | 302 | 0.55 | 0.29 |
| PFT77857 | Scored | 248 | 0.92 | 0.20 |
| PFT77858 | Scored | 604 | 0.61 | 0.11 |

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|----------|---------|-----|------|-------|
| PFT00091 | Pretest | 615 | 0.98 | 0.14 |
| PFT00099 | Pretest | 615 | 0.99 | -0.01 |
| PFT00110 | Pretest | 615 | 0.91 | 0.15 |
| PFT00121 | Pretest | 614 | 0.95 | 0.12 |
| PFT00124 | Pretest | 615 | 0.98 | 0.20 |
| PFT00125 | Pretest | 615 | 0.97 | 0.07 |
| PFT00686 | Pretest | 109 | 0.60 | -0.08 |
| PFT00689 | Pretest | 109 | 0.69 | 0.38 |
| PFT00692 | Pretest | 109 | 0.78 | 0.29 |
| PFT00693 | Pretest | 109 | 0.41 | 0.36 |
| PFT00697 | Pretest | 109 | 0.78 | 0.13 |
| PFT00699 | Pretest | 109 | 0.97 | 0.02 |
| PFT00705 | Pretest | 109 | 0.93 | 0.05 |
| PFT00706 | Pretest | 109 | 0.95 | 0.09 |
| PFT00710 | Pretest | 109 | 0.76 | 0.23 |
| PFT00711 | Pretest | 109 | 0.76 | 0.28 |
| PFT00713 | Pretest | 109 | 0.31 | 0.18 |
| PFT00714 | Pretest | 109 | 0.76 | 0.31 |
| PFT00715 | Pretest | 109 | 0.88 | 0.12 |
| PFT00718 | Pretest | 109 | 0.75 | 0.32 |
| PFT00720 | Pretest | 109 | 0.97 | 0.02 |
| PFT00724 | Pretest | 108 | 0.80 | 0.14 |
| PFT00728 | Pretest | 108 | 0.53 | 0.17 |
| PFT00730 | Pretest | 109 | 0.65 | 0.36 |
| PFT00731 | Pretest | 109 | 0.90 | -0.01 |
| PFT00732 | Pretest | 109 | 0.98 | 0.08 |
| PFT00734 | Pretest | 109 | 0.86 | 0.38 |
| PFT00747 | Pretest | 109 | 0.80 | 0.21 |
| PFT00761 | Pretest | 109 | 0.98 | -0.02 |
| PFT00762 | Pretest | 109 | 1.00 | 0.00 |
| PFT00769 | Pretest | 109 | 0.98 | 0.04 |
| PFT77058 | Pretest | 615 | 0.88 | 0.08 |
| PFT77060 | Pretest | 615 | 0.99 | 0.17 |
| PFT77079 | Pretest | 615 | 0.52 | 0.14 |
| PFT77092 | Pretest | 615 | 0.57 | 0.30 |
| PFT77164 | Pretest | 613 | 0.58 | 0.04 |
| PFT77168 | Pretest | 615 | 0.85 | 0.13 |
| PFT77206 | Pretest | 615 | 0.65 | 0.13 |
| PFT77208 | Pretest | 615 | 0.80 | 0.21 |
| PFT77216 | Pretest | 615 | 0.99 | 0.15 |
| PFT77614 | Pretest | 614 | 0.77 | 0.26 |
| PFT77615 | Pretest | 612 | 0.47 | 0.28 |
| PFT77616 | Pretest | 614 | 0.71 | 0.30 |

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|----------|---------|-----|------|------|
| PFT77618 | Pretest | 615 | 0.80 | 0.34 |
| PFT77671 | Pretest | 614 | 0.84 | 0.13 |
| PFT77676 | Pretest | 615 | 0.33 | 0.14 |
| PFT77677 | Pretest | 615 | 0.75 | 0.35 |
| PFT77678 | Pretest | 614 | 0.36 | 0.21 |
| PFT77680 | Pretest | 614 | 0.47 | 0.28 |
| PFT77688 | Pretest | 615 | 1.00 | 0.07 |
