# APPENDIX J

## Psychological Assessment

## APPENDIX J: Psychological Assessment

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**TABLE J-1.**

**Summary of Kolmogorov-Smirnov Tests on MMPI for Officers**

| Parameter* | Group | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|
| Anxiety | Ranch Hand | 52.82 | 7.38 | 0.281 |
| | Comparison | 53.64 | 7.77 | |
| Consistency | Ranch Hand | 49.23 | 6.92 | 0.995 |
| | Comparison | 49.23 | 6.62 | |
| Defensiveness | Ranch Hand | 49.64 | 6.64 | 0.990 |
| | Comparison | 49.61 | 6.97 | |
| Denial | Ranch Hand | 59.47 | 7.31 | 0.877 |
| | Comparison | 59.81 | 7.46 | |
| Depression | Ranch Hand | 55.11 | 10.17 | 0.999 |
| | Comparison | 55.27 | 10.28 | |
| Hypochondria | Ranch Hand | 55.60 | 8.85 | 0.970 |
| | Comparison | 55.02 | 8.76 | |
| Hysteria | Ranch Hand | 60.45 | 7.00 | 0.627 |
| | Comparison | 59.97 | 7.47 | |
| Mania/Hypomania | Ranch Hand | 54.36 | 8.94 | 0.092 |
| | Comparison | 53.39 | 9.12 | |
| Masculinity/ Femininity | Ranch Hand | 58.83 | 8.64 | 0.366 |
| | Comparison | 58.10 | 9.07 | |
| Paranoia | Ranch Hand | 53.71 | 7.34 | 0.975 |
| | Comparison | 53.91 | 7.34 | |
| Psychopathic/ Deviate | Ranch Hand | 56.82 | 8.87 | 0.837 |
| | Comparison | 57.08 | 10.02 | |
| Schizophrenia | Ranch Hand | 54.80 | 8.48 | 0.942 |
| | Comparison | 55.14 | 9.02 | |
| Social Introversion | Ranch Hand | 46.56 | 7.43 | 0.594 |
| | Comparison | 47.19 | 7.77 | |
| Validity | Ranch Hand | 0.93 | 3.11 | 0.776 |
| | Comparison | 0.89 | 3.20 | |

*n=380 Ranch Hands; n=480 Comparisons (except for validity, where n=483 Comparisons).

**TABLE J-2.**

**Summary of Kolmogorov-Smirnov Tests on MMPI for Enlisted Flyers**

| Parameter* | Group | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|
| Anxiety | Ranch Hand | 54.78 | 9.73 | 0.678 |
| | Comparison | 55.09 | 10.09 | |
| Consistency | Ranch Hand | 52.24 | 10.30 | 0.995 |
| | Comparison | 51.83 | 8.22 | |
| Defensiveness | Ranch Hand | 53.05 | 7.96 | 0.270 |
| | Comparison | 52.00 | 8.31 | |
| Denial | Ranch Hand | 55.95 | 8.73 | 0.807 |
| | Comparison | 56.95 | 8.50 | |
| Depression | Ranch Hand | 58.21 | 11.79 | 0.744 |
| | Comparison | 58.32 | 11.86 | |
| Hypochondria | Ranch Hand | 58.48 | 12.16 | 0.496 |
| | Comparison | 59.25 | 12.85 | |
| Hysteria | Ranch Hand | 60.00 | 8.94 | 0.366 |
| | Comparison | 61.32 | 9.47 | |
| Mania/Hypomania | Ranch Hand | 55.05 | 10.00 | 0.496 |
| | Comparison | 54.99 | 9.87 | |
| Masculinity/ Femininity | Ranch Hand | 55.79 | 7.85 | 0.776 |
| | Comparison | 56.57 | 8.46 | |
| Paranoia | Ranch Hand | 52.77 | 8.43 | 0.695 |
| | Comparison | 51.92 | 7.83 | |
| Psychopathic/ Deviate | Ranch Hand | 57.48 | 11.40 | 0.088 |
| | Comparison | 58.95 | 10.79 | |
| Schizophrenia | Ranch Hand | 56.56 | 13.03 | 0.178 |
| | Comparison | 57.06 | 11.49 | |
| Social Introversion | Ranch Hand | 50.35 | 8.89 | 0.678 |
| | Comparison | 49.48 | 8.14 | |
| Validity | Ranch Hand | 3.93 | 42.48 | 0.864 |
| | Comparison | 6.31 | 54.96 | |

*n=176 Ranch Hands; n=208 Comparisons (except for validity, where n=177 Ranch Hands and n=210 Comparisons).

TABLE J-3.

**Summary of Kolmogorov-Smirnov Tests on MMPI for Enlisted Groundcrew**

| Parameter* | Group | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|
| Anxiety | Ranch Hand | 55.86 | 10.96 | 0.993 |
| | Comparison | 55.61 | 9.58 | |
| Consistency | Ranch Hand | 53.05 | 10.64 | 0.877 |
| | Comparison | 52.03 | 8.43 | |
| Defensiveness | Ranch Hand | 52.42 | 8.27 | 0.970 |
| | Comparison | 52.60 | 8.35 | |
| Denial | Ranch Hand | 55.53 | 8.57 | 0.118 |
| | Comparison | 56.52 | 8.88 | |
| Depression | Ranch Hand | 58.79 | 12.98 | 0.594 |
| | Comparison | 57.66 | 10.78 | |
| Hypochondria | Ranch Hand | 58.44 | 13.22 | 0.142 |
| | Comparison | 57.13 | 11.12 | |
| Hysteria | Ranch Hand | 60.36 | 9.80 | 0.577 |
| | Comparison | 59.78 | 8.99 | |
| Mania/Hypomania | Ranch Hand | 55.26 | 9.78 | 0.450 |
| | Comparison | 56.33 | 10.17 | |
| Masculinity/ Femininity | Ranch Hand | 56.18 | 8.24 | 0.292 |
| | Comparison | 57.18 | 8.82 | |
| Paranoia | Ranch Hand | 53.12 | 9.05 | 0.393 |
| | Comparison | 53.73 | 8.47 | |
| Psychopathic/ Deviate | Ranch Hand | 59.01 | 11.29 | 0.728 |
| | Comparison | 59.26 | 10.66 | |
| Schizophrenia | Ranch Hand | 58.20 | 14.22 | 0.837 |
| | Comparison | 57.36 | 11.12 | |
| Social Introversion | Ranch Hand | 51.86 | 9.82 | 0.107 |
| | Comparison | 50.43 | 8.71 | |
| Validity | Ranch Hand | 1.97 | 26.48 | 0.999 |
| | Comparison | 0.89 | 4.80 | |

*n=458 Ranch Hands; n=598 Comparisons (except for validity, where n=459 Ranch Hands and n=599 Comparisons).

TABLE J-4.

Summary of Group-by-Covariate Interactions for Psychological Variables

| Variable | Interaction | Stratification | Statistic | Group: Ranch Hand | | Group: Comparison | | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Anxiety | Group-by-Education | High School | n | 564 | | 685 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 57 | 10.1% | 49 | 7.2% | 1.39 (0.92,2.08) | 0.114 |
| | | | Normal | 507 | 89.9% | 636 | 92.8% | | |
| | | College | n | 448 | | 600 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 16 | 3.6% | 30 | 5.0% | 0.68 (0.36,1.28) | 0.233 |
| | | | Normal | 432 | 96.4% | 570 | 95.0% | | |
| Consistency | Group-by-Education | High School | n | 537 | | 661 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 30 | 5.6% | 19 | 2.9% | 1.81 (1.00,3.28) | 0.051 |
| | | | Normal | 507 | 94.4% | 642 | 97.5% | | |
| | | College | n | 437 | | 585 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 6 | 1.4% | 15 | 2.6% | 0.46 (0.17,1.19) | 0.110 |
| | | | Normal | 431 | 98.6% | 570 | 97.4% | | |
| Depression | Group-by-Combat Index | Low | n | 192 | | 490 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 28 | 14.6% | 40 | 8.2% | 1.73 (1.03,2.91) | 0.039 |
| | | | Normal | 164 | 85.4% | 450 | 91.8% | | |
| | | Medium | n | 368 | | 417 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 37 | 10.1% | 38 | 9.1% | 1.09 (0.67,1.75) | 0.657 |
| | | | Normal | 331 | 89.9% | 379 | 90.9% | | |
| | | High | n | 414 | | 339 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 43 | 10.4% | 47 | 13.9% | 0.74 (0.48,1.16) | 0.159 |
| | | | Normal | 371 | 89.6% | 292 | 86.1% | | |

TABLE J-4. (continued)

Summary of Group-by-Covariate Interactions for Psychological Variables

| Variable | Interaction | Stratification | Statistic | Group: Ranch Hand | | Group: Comparison | | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Paranoia | Group-by Age | Born ≥1942 | n | 410 | | 545 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 15 | 3.7% | 19 | 3.5% | 0.88 (0.43,1.77) | 0.712 |
| | | | Normal | 395 | 96.3% | 526 | 96.5% | | |
| | | Born <1942 | n | 602 | | 740 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 16 | 2.7% | 9 | 1.2% | 2.63 (1.11,6.20) | 0.027 |
| | | | Normal | 586 | 97.3% | 731 | 98.8% | | |
| Schizophrenia | Group-by-Education | High School | n | 537 | | 665 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 72 | 13.4% | 63 | 9.5% | 1.51 (1.05,2.16) | 0.033 |
| | | | Normal | 465 | 86.6% | 602 | 90.5% | | |
| | | College | n | 439 | | 585 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 18 | 4.1% | 37 | 6.3% | 0.63 (0.35,1.12) | 0.119 |
| | | | Normal | 421 | 95.9% | 548 | 93.7% | | |
| Social Introversion | Group-by-Combat Index | Low | n | 198 | | 509 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 11 | 5.6% | 6 | 1.2% | 4.86 (1.77,13.36) | 0.002 |
| | | | Normal | 187 | 94.4% | 503 | 98.8% | | |
| | | Medium | n | 384 | | 427 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 6 | 1.6% | 4 | 0.9% | 1.59 (0.44,5.68) | 0.478 |
| | | | Normal | 378 | 98.4% | 423 | 99.1% | | |
| | | High | n | 430 | | 349 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 9 | 2.1% | 9 | 2.6% | 0.82 (0.32,2.09) | 0.677 |
| | | | Normal | 421 | 97.9% | 340 | 97.4% | | |

**TABLE J-4. (continued)**

**Summary of Group-by-Covariate Interactions for Psychological Variables**

| Variable | Interaction | Stratification | Statistic | Group: Ranch Hand | | Group: Comparison | | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Validity | Group-by-Race | Nonblack | n | 954 | | 1,206 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 208 | 21.8% | 235 | 19.5% | 1.20 (0.97,1.49) | 0.095 |
| | | | 0 | 746 | 78.2% | 971 | 80.5% | | |
| | | Black | n | 60 | | 83 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 15 | 25.0% | 35 | 42.2% | 0.46 (0.22,0.96) | 0.038 |
| | | | 0 | 45 | 75.0% | 48 | 57.8% | | |
| Total CMI | Group-by-Education | High School | n | 529 | | 655 | | | |
| | | | Number/% | | | | | | |
| | | | Adj. Mean* | 37.18 | | 31.43 | | -- | <0.001 |
| | | | 95% C.I.* | (30.25,45.65) | | (25.46,38.76) | | | |
| | | College | n | 433 | | 574 | | | |
| | | | Number/% | | | | | | |
| | | | Adj. Mean* | 23.72 | | 24.22 | | -- | 0.657 |
| | | | 95% C.I.* | (19.10,29.41) | | (19.57,29.91) | | | |
| M-R Subscore | Group-by-Education | High School | n | 555 | | 675 | | Overall: | 0.030 |
| | | | Number/% | | | | | Medium vs. Low | |
| | | | 0 (Low) | 246 | 44.3% | 352 | 52.1% | 1.37 (1.07,1.75) | 0.014 |
| | | | 1-10(Medium) | 267 | 48.1% | 283 | 41.9% | High vs. Low | |
| | | | >10 (High) | 42 | 7.6% | 40 | 5.9% | 1.33 (0.82,2.15) | 0.254 |
| | | College | n | 443 | | 590 | | Overall: | 0.699 |
| | | | Number/% | | | | | Medium vs. Low | |
| | | | 0 (Low) | 292 | 65.9% | 373 | 63.2% | 0.91 (0.70,1.18) | 0.465 |
| | | | 1-10(Medium) | 141 | 31.8% | 200 | 33.9% | High vs. Low | |
| | | | >10 (High) | 10 | 2.3% | 17 | 2.9% | 0.80 (0.35,1.84) | 0.597 |

*Transformed from log(X+1) scale, where X was the number of questions answered "yes."
--No relative risk given for Total CMI, which was analyzed as a continuous variable.

TABLE J-5.

Summary of Kolmogorov-Smirnov Tests on CMI

| Stratification | Group | Sample Size | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|---|
| Age | | | | | |
| Born ≥1942 | Ranch Hand | 402 | 15.88 | 15.21 | <0.001 |
| | Comparison | 543 | 13.07 | 12.40 | |
| Born 1923-1941 | Ranch Hand | 562 | 15.49 | 12.99 | 0.281 |
| | Comparison | 674 | 14.64 | 12.52 | |
| Born ≤1922 | Ranch Hand | 36 | 18.56 | 15.94 | 0.970 |
| | Comparison | 51 | 16.57 | 9.27 | |
| Race | | | | | |
| Nonblack | Ranch Hand | 941 | 15.63 | 13.83 | 0.003 |
| | Comparison | 1,187 | 13.94 | 12.00 | |
| Black | Ranch Hand | 59 | 17.81 | 16.91 | 0.481 |
| | Comparison | 81 | 15.68 | 17.01 | |
| Education | | | | | |
| High School | Ranch Hand | 556 | 18.88 | 15.80 | <0.001 |
| | Comparison | 677 | 15.77 | 13.50 | |
| College | Ranch Hand | 444 | 11.85 | 10.18 | 0.999 |
| | Comparison | 591 | 12.08 | 10.63 | |
| Current Alcohol Use | | | | | |
| Drinker | Ranch Hand | 851 | 15.16 | 13.12 | 0.024 |
| | Comparison | 1,092 | 13.72 | 12.00 | |
| Nondrinker | Ranch Hand | 148 | 18.84 | 17.71 | 0.149 |
| | Comparison | 176 | 16.06 | 14.38 | |
| Occupation | | | | | |
| Officer | Ranch Hand | 377 | 11.23 | 9.01 | 0.807 |
| | Comparison | 476 | 10.88 | 9.09 | |
| Enlisted Flyer | Ranch Hand | 174 | 17.72 | 14.84 | 0.220 |
| | Comparison | 204 | 15.63 | 13.53 | |
| Enlisted Groundcrew | Ranch Hand | 449 | 18.80 | 16.06 | 0.007 |
| | Comparison | 588 | 16.06 | 13.69 | |

**TABLE J-6.**

**Unadjusted Exposure Index Analyses for Psychological Variables by Occupation**

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| Anxiety | Officer | n | 127 | 130 | 123 | Overall | | 0.876 |
| | | Number/% | | | | | | |
| | | Abnormal | 2 1.6% | 3 2.3% | 3 2.4% | M vs. L | 1.48 (0.24,8.99) | 0.999 |
| | | Normal | 125 98.4% | 127 97.7% | 120 97.6% | H vs. L | 1.56 (0.26,9.52) | 0.680 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.211 |
| | | Number/% | | | | | | |
| | | Abnormal | 8 14.8% | 4 6.2% | 4 7.0% | M vs. L | 0.38 (0.11,1.33) | 0.137 |
| | | Normal | 46 85.2% | 61 93.8% | 53 93.0% | H vs. L | 0.43 (0.12,1.54) | 0.230 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.560 |
| | | Number/% | | | | | | |
| | | Abnormal | 19 12.3% | 18 11.0% | 12 8.5% | M vs. L | 0.88 (0.44,1.75) | 0.730 |
| | | Normal | 135 87.7% | 145 89.0% | 129 91.5% | H vs. L | 0.66 (0.31,1.42) | 0.343 |
| Consistency | Officer | n | 127 | 130 | 123 | Overall | | 0.380 |
| | | Number/% | | | | | | |
| | | Abnormal | 2 1.6% | 2 1.5% | 0 0.0% | M vs. L | 0.98 (0.14,7.04) | 0.999 |
| | | Normal | 125 98.4% | 128 98.5% | 123 100.0% | H vs. L | 0.20 (0.01,4.28)* | 0.498 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.476 |
| | | Number/% | | | | | | |
| | | Abnormal | 4 7.4% | 2 3.1% | 2 3.5% | M vs. L | 0.40 (0.07,2.26) | 0.409 |
| | | Normal | 50 92.6% | 63 96.9% | 55 96.5% | H vs. L | 0.46 (0.08,2.59) | 0.430 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.813 |
| | | Number/% | | | | | | |
| | | Abnormal | 9 5.8% | 9 5.5% | 6 4.3% | M vs. L | 0.94 (0.36,2.44) | 0.999 |
| | | Normal | 145 94.2% | 154 94.5% | 135 95.7% | H vs. L | 0.72 (0.25,2.07) | 0.603 |

**TABLE J-6. (continued)**

**Unadjusted Exposure Index Analyses for Psychological Variables by Occupation**

| Variable | Occupation | Statistic | Exposure Index Low | | Exposure Index Medium | | Exposure Index High | | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Defensiveness | Officer | n | 127 | | 130 | | 123 | | Overall | | 0.603 |
| | | Number/% | | | | | | | | | |
| | | Abnormal | 0 | 0.0% | 1 | 0.8% | 1 | 0.8% | M vs. L | 2.95 (0.12,73.18)* | 0.999 |
| | | Normal | 127 | 100.0% | 129 | 99.2% | 122 | 99.2% | H vs. L | 3.12 (0.13,77.39)* | 0.492 |
| | Enlisted Flyer | n | 54 | | 65 | | 57 | | Overall | | 0.991 |
| | | Number/% | | | | | | | | | |
| | | Abnormal | 1 | 1.9% | 1 | 1.5% | 1 | 1.8% | M vs. L | 0.83 (0.05,13.56) | 0.999 |
| | | Normal | 53 | 98.1% | 64 | 98.5% | 56 | 98.2% | H vs. L | 0.95 (0.06,15.52) | 0.999 |
| | Enlisted Groundcrew | n | 154 | | 163 | | 141 | | Overall | | 0.697 |
| | | Number/% | | | | | | | | | |
| | | Abnormal | 6 | 3.9% | 5 | 3.1% | 7 | 5.0% | M vs. L | 0.78 (0.23,2.61) | 0.765 |
| | | Normal | 148 | 96.1% | 158 | 96.9% | 134 | 95.0% | H vs. L | 1.29 (0.42,3.93) | 0.779 |
| Denial | Officer | n | 127 | | 130 | | 123 | | Overall | | 0.094 |
| | | Number/% | | | | | | | | | |
| | | Abnormal | 6 | 4.7% | 2 | 1.5% | 1 | 0.8% | M vs. L | 0.32 (0.06,1.59) | 0.169 |
| | | Normal | 121 | 95.3% | 128 | 98.5% | 122 | 99.2% | H vs. L | 0.17 (0.02,1.39) | 0.120 |
| | Enlisted Flyer | n | 54 | | 65 | | 57 | | Overall | | 0.366 |
| | | Number/% | | | | | | | | | |
| | | Abnormal | 2 | 3.7% | 2 | 3.1% | 0 | 0.0% | M vs. L | 0.83 (0.11,6.06) | 0.999 |
| | | Normal | 52 | 96.3% | 63 | 96.9% | 57 | 100.0% | H vs. L | 0.18 (0.01,3.89)* | 0.234 |
| | Enlisted Groundcrew | n | 154 | | 163 | | 141 | | Overall | | 0.326 |
| | | Number/% | | | | | | | | | |
| | | Abnormal | 2 | 1.3% | 0 | 0.0% | 2 | 1.4% | M vs. L | 0.19 (0.01,3.92)* | 0.235 |
| | | Normal | 152 | 98.7% | 163 | 100.0% | 139 | 98.6% | H vs. L | 1.09 (0.15,7.87) | 0.999 |

**TABLE J-6. (continued)**

**Unadjusted Exposure Index Analyses for Psychological Variables by Occupation**

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| Depression | Officer | n | 127 | 130 | 123 | Overall | | 0.517 |
| | | Number/% | | | | | | |
| | | Abnormal | 8 6.3% | 6 4.6% | 10 8.1% | M vs. L | 0.72 (0.24,2.14) | 0.593 |
| | | Normal | 119 93.7% | 124 95.4% | 113 91.9% | H vs. L | 1.32 (0.50,3.45) | 0.631 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.223 |
| | | Number/% | | | | | | |
| | | Abnormal | 11 20.4% | 7 10.8% | 6 10.5% | M vs. L | 0.47 (0.17,1.32) | 0.199 |
| | | Normal | 43 79.6% | 58 89.2% | 51 89.5% | H vs. L | 0.46 (0.16,1.35) | 0.191 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.695 |
| | | Number/% | | | | | | |
| | | Abnormal | 25 16.2% | 21 12.9% | 20 14.2% | M vs. L | 0.76 (0.41,1.43) | 0.428 |
| | | Normal | 129 83.8% | 142 87.1% | 121 85.8% | H vs. L | 0.85 (0.45,1.62) | 0.746 |
| Hypochondria | Officer | n | 127 | 130 | 123 | Overall | | 0.530 |
| | | Number/% | | | | | | |
| | | Abnormal | 10 7.9% | 6 4.6% | 9 7.3% | M vs. L | 0.57 (0.20,1.61) | 0.312 |
| | | Normal | 117 92.1% | 124 95.4% | 114 92.7% | H vs. L | 0.92 (0.36,2.36) | 0.999 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.059 |
| | | Number/% | | | | | | |
| | | Abnormal | 11 20.4% | 4 6.2% | 10 17.5% | M vs. L | 0.26 (0.08,0.86) | 0.026 |
| | | Normal | 43 79.6% | 61 93.8% | 47 82.5% | H vs. L | 0.83 (0.32,2.15) | 0.810 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.176 |
| | | Number/% | | | | | | |
| | | Abnormal | 25 16.2% | 18 11.0% | 26 18.4% | M vs. L | 0.64 (0.33,1.23) | 0.192 |
| | | Normal | 129 83.8% | 145 89.0% | 115 81.6% | H vs. L | 1.17 (0.64,2.13) | 0.646 |

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| Hysteria | Officer | n | 127 | 130 | 123 | Overall | | 0.200 |
| | | Number/% | | | | | | |
| | | Abnormal | 7 5.5% | 9 6.9% | 14 11.4% | M vs. L | 1.28 (0.46,3.53) | 0.797 |
| | | Normal | 120 94.5% | 121 93.1% | 109 88.6% | H vs. L | 2.20 (0.86,5.66) | 0.113 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.198 |
| | | Number/% | | | | | | |
| | | Abnormal | 11 20.4% | 6 9.2% | 7 12.3% | M vs. L | 0.40 (0.14,1.16) | 0.115 |
| | | Normal | 43 79.6% | 59 90.8% | 50 87.7% | H vs. L | 0.55 (0.20,1.54) | 0.307 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.065 |
| | | Number/% | | | | | | |
| | | Abnormal | 28 18.2% | 16 9.8% | 25 17.7% | M vs. L | 0.49 (0.25,0.95) | 0.035 |
| | | Normal | 126 81.8% | 147 90.2% | 116 82.3% | H vs. L | 0.97 (0.54,1.76) | 0.999 |
| Mania/ Hypomania | Officer | n | 127 | 130 | 123 | Overall | | 0.585 |
| | | Number/% | | | | | | |
| | | Abnormal | 8 6.3% | 5 3.9% | 8 6.5% | M vs. L | 0.60 (0.19,1.87) | 0.407 |
| | | Normal | 119 93.7% | 125 96.1% | 115 93.5% | H vs. L | 1.04 (0.38,2.85) | 0.999 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.623 |
| | | Number/% | | | | | | |
| | | Abnormal | 3 5.6% | 6 9.2% | 6 10.5% | M vs. L | 1.73 (0.41,7.27) | 0.509 |
| | | Normal | 51 94.4% | 59 90.8% | 51 89.5% | H vs. L | 2.00 (0.47,8.44) | 0.491 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.568 |
| | | Number/% | | | | | | |
| | | Abnormal | 11 7.1% | 10 6.1% | 6 4.3% | M vs. L | 0.85 (0.35,2.06) | 0.823 |
| | | Normal | 143 92.9% | 153 93.9% | 135 95.7% | H vs. L | 0.58 (0.21,1.61) | 0.326 |

**TABLE J-6. (continued)**

**Unadjusted Exposure Index Analyses for Psychological Variables by Occupation**

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| Masculinity/ Femininity | Officer | n | 127 | 130 | 123 | Overall | | 0.142 |
| | | Number/% | | | | | | |
| | | Abnormal | 7 5.5% | 15 11.5% | 15 12.2% | M vs. L | 2.24 (0.88,5.68) | 0.118 |
| | | Normal | 120 94.5% | 115 88.5% | 108 87.8% | H vs. L | 2.38 (0.94,6.06) | 0.075 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.478 |
| | | Number/% | | | | | | |
| | | Abnormal | 1 1.9% | 4 6.2% | 2 3.5% | M vs. L | 3.48 (0.38,32.06) | 0.375 |
| | | Normal | 53 98.1% | 61 93.8% | 55 96.5% | H vs. L | 1.93 (0.17,21.89) | 0.999 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.360 |
| | | Number/% | | | | | | |
| | | Abnormal | 10 6.5% | 5 3.1% | 7 5.0% | M vs. L | 0.46 (0.15,1.37) | 0.189 |
| | | Normal | 144 93.5% | 158 96.9% | 134 95.0% | H vs. L | 0.75 (0.28,2.03) | 0.625 |
| Paranoia | Officer | n | 127 | 130 | 123 | Overall | | 0.194 |
| | | Number/% | | | | | | |
| | | Abnormal | 1 0.8% | 1 0.8% | 4 3.3% | M vs. L | 0.98 (0.06,15.79) | 0.999 |
| | | Normal | 126 99.2% | 129 99.2% | 119 96.7% | H vs. L | 4.24 (0.47,38.44) | 0.208 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.447 |
| | | Number/% | | | | | | |
| | | Abnormal | 3 5.6% | 1 1.5% | 3 5.3% | M vs. L | 0.27 (0.03,2.63) | 0.328 |
| | | Normal | 51 94.4% | 64 98.5% | 54 94.7% | H vs. L | 0.94 (0.18,4.90) | 0.999 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.735 |
| | | Number/% | | | | | | |
| | | Abnormal | 5 3.3% | 6 3.7% | 7 5.0% | M vs. L | 1.14 (0.34,3.81) | 0.999 |
| | | Normal | 149 96.7% | 157 96.3% | 134 95.0% | H vs. L | 1.56 (0.48,5.02) | 0.560 |

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| Psychopathic/ Deviate | Officer | n | 127 | 130 | 123 | Overall | | 0.545 |
| | | Number/% | | | | | | |
| | | Abnormal | 9 7.1% | 7 5.4% | 11 8.9% | M vs. L | 0.75 (0.27,2.07) | 0.614 |
| | | Normal | 118 92.9% | 123 94.6% | 112 91.1% | H vs. L | 1.29 (0.51,3.23) | 0.646 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.593 |
| | | Number/% | | | | | | |
| | | Abnormal | 8 14.8% | 11 16.9% | 6 10.5% | M vs. L | 1.17 (0.43,3.16) | 0.806 |
| | | Normal | 46 85.2% | 54 83.1% | 51 89.5% | H vs. L | 0.68 (0.22,2.10) | 0.574 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.220 |
| | | Number/% | | | | | | |
| | | Abnormal | 25 16.2% | 18 11.0% | 25 17.7% | M vs. L | 0.64 (0.33,1.23) | 0.192 |
| | | Normal | 129 83.8% | 145 89.0% | 116 82.3% | H vs. L | 1.11 (0.61,2.04) | 0.758 |
| Schizophrenia | Officer | n | 127 | 130 | 123 | Overall | | 0.546 |
| | | Number/% | | | | | | |
| | | Abnormal | 5 3.9% | 4 3.1% | 2 1.6% | M vs. L | 0.78 (0.20,2.95) | 0.747 |
| | | Normal | 122 96.1% | 126 96.9% | 121 98.4% | H vs. L | 0.40 (0.08,2.12) | 0.447 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.519 |
| | | Number/% | | | | | | |
| | | Abnormal | 8 14.8% | 6 9.2% | 5 8.8% | M vs. L | 0.59 (0.19,1.80) | 0.400 |
| | | Normal | 46 85.2% | 59 90.8% | 52 91.2% | H vs. L | 0.55 (0.17,1.81) | 0.385 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.600 |
| | | Number/% | | | | | | |
| | | Abnormal | 18 11.7% | 25 15.3% | 21 14.9% | M vs. L | 1.37 (0.71,2.62) | 0.413 |
| | | Normal | 136 88.3% | 138 84.7% | 120 85.1% | H vs. L | 1.32 (0.67,2.60) | 0.492 |

**TABLE J-6. (continued)**

**Unadjusted Exposure Index Analyses for Psychological Variables by Occupation**

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| Social Introversion | Officer | n | 127 | 130 | 123 | Overall | | 0.385 |
| | | Number/% | | | | | | |
| | | Abnormal | 1 0.8% | 2 1.5% | 0 0.0% | M vs. L | 1.97 (0.18,21.99) | 0.999 |
| | | Normal | 126 99.2% | 128 98.5% | 123 100.0% | H vs. L | 0.34 (0.01,8.46)* | 0.999 |
| | Enlisted Flyer | n | 54 | 65 | 57 | Overall | | 0.696 |
| | | Number/% | | | | | | |
| | | Abnormal | 2 3.7% | 1 1.5% | 1 1.8% | M vs. L | 0.41 (0.04,4.61) | 0.590 |
| | | Normal | 52 96.3% | 64 98.5% | 56 98.2% | H vs. L | 0.46 (0.04,5.27) | 0.611 |
| | Enlisted Groundcrew | n | 154 | 163 | 141 | Overall | | 0.635 |
| | | Number/% | | | | | | |
| | | Abnormal | 8 5.2% | 5 3.1% | 6 4.3% | M vs. L | 0.58 (0.19,1.81) | 0.403 |
| | | Normal | 146 94.8% | 158 96.9% | 135 95.7% | H vs. L | 0.81 (0.27,2.40) | 0.788 |
| Validity | Officer | n | 127 | 130 | 123 | Overall | | 0.052 |
| | | Number/% | | | | | | |
| | | >0 | 32 25.2% | 34 26.2% | 18 14.6% | M vs. L | 1.05 (0.60,1.84) | 0.887 |
| | | 0 | 95 74.8% | 96 73.8% | 105 85.4% | H vs. L | 0.51 (0.27,0.97) | 0.041 |
| | Enlisted Flyer | n | 55 | 65 | 57 | Overall | | 0.310 |
| | | Number/% | | | | | | |
| | | Abnormal | 10 18.2% | 8 12.3% | 13 22.8% | M vs. L | 0.63 (0.23,1.73) | 0.445 |
| | | Normal | 45 81.8% | 57 87.7% | 44 77.2% | H vs. L | 1.33 (0.53,3.35) | 0.642 |
| | Enlisted Groundcrew | n | 154 | 163 | 142 | Overall | | 0.802 |
| | | Number/% | | | | | | |
| | | >0 | 34 22.1% | 39 23.9% | 36 25.4% | M vs. L | 1.11 (0.66,1.87) | 0.790 |
| | | 0 | 120 77.9% | 124 76.1% | 106 74.6% | H vs. L | 1.20 (0.70,2.05) | 0.584 |

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| Total Cornell Medical Index | Officer | n | 126 | 128 | 123 | Overall | | 0.049 |
| | | Mean** | 7.99 | 8.55 | 10.04 | M vs. L | -- | 0.506 |
| | | 95% C.I.** | (6.84,9.31) | (7.52,9.69) | (8.99,11.20) | H vs. L | -- | 0.018 |
| | Enlisted Flyer | n | 53 | 65 | 56 | Overall | | 0.906 |
| | | Mean** | 13.69 | 13.13 | 13.96 | M vs. L | -- | 0.784 |
| | | 95% C.I.** | (10.63, 17.56) | (11.16, 15.42) | (11.51, 16.88) | H vs. L | -- | 0.906 |
| | Enlisted Groundcrew | n | 153 | 159 | 137 | Overall | | 0.304 |
| | | Mean** | 14.46 | 13.03 | 14.92 | M vs. L | -- | 0.252 |
| | | 95% C.I.** | (12.64, 16.52) | (11.57, 14.65) | (13.05, 17.05) | M vs. L | -- | 0.745 |
| M-R Subscore | Officer | n | 125 | 128 | 121 | Overall | | 0.247 |
| | | Number/% | | | | | | |
| | | >0 | 41 32.8% | 37 28.9% | 47 38.8% | M vs. L | 0.83 (0.49,1.42) | 0.586 |
| | | 0 | 84 67.2% | 91 71.1% | 74 61.2% | H vs. L | 1.30 (0.77,2.19) | 0.353 |
| | Enlisted Flyer | n | 53 | 65 | 56 | Overall | | 0.400 |
| | | Number/% | | | | | | |
| | | Abnormal | 22 41.5% | 35 53.8% | 26 46.4% | M vs. L | 1.64 (0.79,3.42) | 0.200 |
| | | Normal | 31 58.5% | 30 46.2% | 30 53.6% | H vs. L | 1.22 (0.57,2.61) | 0.700 |
| | Enlisted Groundcrew | n | 154 | 157 | 139 | Overall | | 0.592 |
| | | Number/% | | | | | | |
| | | >0 | 91 59.1% | 87 55.4% | 74 53.2% | M vs. L | 0.86 (0.55,1.35) | 0.567 |
| | | 0 | 63 40.9% | 70 44.6% | 65 46.8% | H vs. L | 0.79 (0.50,1.25) | 0.346 |

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

| Variable | Occupation | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|
| A-H Area Subscore | Officer | n | 113 | 112 | 114 | Overall | | 0.980 |
| | | Number/% | | | | | | |
| | | >0 | 57 50.4% | 56 50.0% | 56 49.1% | M vs. L | 0.98 (0.58,1.66) | 0.999 |
| | | 0 | 56 49.6% | 56 50.0% | 58 50.9% | H vs. L | 0.95 (0.56,1.60) | 0.895 |
| | Enlisted Flyer | n | 50 | 60 | 50 | Overall | | 0.946 |
| | | Number/% | | | | | | |
| | | >0 | 33 66.0% | 39 65.0% | 34 68.0% | M vs. L | 0.96 (0.43,2.11) | 0.999 |
| | | 0 | 17 34.0% | 21 35.0% | 16 32.0% | H vs. L | 1.10 (0.48,2.52) | 0.999 |
| | Enlisted Groundcrew | n | 136 | 150 | 129 | Overall | | 0.557 |
| | | Number/% | | | | | | |
| | | >0 | 93 68.4% | 96 64.0% | 90 69.8% | M vs. L | 0.82 (0.50,1.34) | 0.455 |
| | | 0 | 43 31.6% | 54 36.0% | 39 30.2% | H vs. L | 1.07 (0.63,1.80) | 0.894 |
| HRB Impairment Index | Officer | n | 126 | 130 | 121 | Overall | | 0.401 |
| | | Number/% | | | | | | |
| | | Abnormal | 29 23.0% | 31 23.9% | 21 17.4% | M vs. L | 1.05 (0.59,1.87) | 0.884 |
| | | Normal | 97 77.0% | 99 76.1% | 100 82.6% | H vs. L | 0.70 (0.38,1.32) | 0.342 |
| | Enlisted Flyer | n | 52 | 65 | 57 | Overall | | 0.253 |
| | | Number/% | | | | | | |
| | | Abnormal | 20 38.5% | 35 53.9% | 27 47.4% | M vs. L | 1.87 (0.89,3.92) | 0.136 |
| | | Normal | 32 61.5% | 30 46.1% | 30 52.6% | H vs. L | 1.44 (0.67,3.09) | 0.439 |
| | Enlisted Groundcrew | n | 153 | 163 | 139 | Overall | | 0.272 |
| | | Number/% | | | | | | |
| | | Abnormal | 64 41.8% | 72 44.2% | 49 35.3% | M vs. L | 1.10 (0.71,1.72) | 0.733 |
| | | Normal | 89 58.2% | 91 55.8% | 90 64.7% | H vs. L | 0.76 (0.47,1.22) | 0.280 |

*Estimated relative risk and confidence interval calculated after adding 0.5 to each cell.
**Converted from log (X+1) scale, where X was the number of questions answered "yes."
--No relative risk given for Total Cornell Medical Index, which was analyzed as a continuous variable.

TABLE J-7.

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Medium | | High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anxiety | Exposure Index-by-Race (Enlisted Groundcrew) | Nonblack | n | 138 | | 149 | | 128 | | Overall | | 0.932* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 14 | 10.1% | 16 | 10.7% | 12 | 9.4% | M vs. L | 1.07 (0.50,2.27)* | 0.999* |
| | | | Normal | 124 | 89.9% | 133 | 89.3% | 116 | 90.6% | H vs. L | 0.92 (0.41,2.06)* | 0.999* |
| | | Black | n | 16 | | 14 | | 13 | | Overall | | 0.074* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 5 | 31.3% | 2 | 14.3% | 0 | 0.0% | M vs. L | 0.37 (0.06,2.29)* | 0.399* |
| | | | Normal | 11 | 68.7% | 12 | 85.7% | 13 | 100.0% | H vs. L | 0.08 (0.004,1.56)** | 0.048* |
| Denial | Exposure Index-by-Age (Officer) | Born >=1942 | n | 43 | | 22 | | 11 | | Overall | | 0.455* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 2 | 4.7% | 0 | 0.0% | 0 | 0.0% | M vs. L | 0.37 (0.02,8.02)** | 0.545* |
| | | | Normal | 41 | 95.3% | 22 | 100.0% | 11 | 100.0% | H vs. L | 0.72 (0.03,16.12)** | 0.999* |
| | | Born 1923-1941(a) | n | 79 | | 93 | | 109 | | Overall | | 0.337 |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 3 | 3.8% | 1 | 1.1% | 1 | 0.9% | M vs. L | 0.27 (0.03,2.61) | 0.255 |
| | | | Normal | 76 | 96.2% | 92 | 98.9% | 108 | 99.1% | H vs. L | 0.25 (0.03,2.49) | 0.238 |
| | | Born <=1922 | n | 5 | | 15 | | 3 | | Overall | | 0.558* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 1 | 20.0% | 1 | 6.7% | 0 | 0.0% | M vs. L | 0.29 (0.01,5.66)* | 0.447* |
| | | | Normal | 4 | 80.0% | 14 | 93.3% | 3 | 100.0% | H vs. L | 0.43 (0.01,14.08)** | 0.999* |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Medium | | High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depression | Exposure Index-by-Race (Enlisted Groundcrew) | Nonblack | n | 138 | | 149 | | 128 | | Overall | | 0.856* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 21 | 15.2% | 20 | 13.4% | 20 | 15.6% | M vs. L | 0.86 (0.45,1.67)* | 0.737* |
| | | | Normal | 117 | 84.8% | 129 | 86.6% | 108 | 84.4% | H vs. L | 1.03 (0.53,2.01)* | 0.999* |
| | | Black | n | 16 | | 14 | | 13 | | Overall | | 0.092* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 4 | 25.0% | 1 | 7.1% | 0 | 0.0% | M vs. L | 0.23 (0.02,2.37)* | 0.336* |
| | | | Normal | 12 | 75.0% | 13 | 92.9% | 13 | 100.0% | H vs. L | 0.10 (0.01,2.11)** | 0.107* |
| Hypochondria | Exposure Index-by-Education (Officer) | High School | n | 11 | | 17 | | 24 | | Overall | | 0.011* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 4 | 36.4% | 3 | 17.7% | 0 | 0.0% | M vs. L | 0.38 (0.07,2.16)* | 0.381* |
| | | | Normal | 7 | 63.6% | 14 | 82.3% | 24 | 100.0% | H vs. L | 0.03 (0.002,0.71)** | 0.006* |
| | | College | n | 116 | | 113 | | 99 | | Overall | | 0.120* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 6 | 5.2% | 3 | 2.7% | 9 | 9.1% | M vs. L | 0.50 (0.12,2.05)* | 0.499* |
| | | | Normal | 110 | 94.8% | 110 | 97.3% | 90 | 90.9% | H vs. L | 1.83 (0.63,5.34)* | 0.293* |
| Hypochondria | Exposure Index-by-Race (Enlisted Groundcrew) | Nonblack | n | 134 | | 146 | | 119 | | | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 17 | 12.7% | 15 | 10.3% | 25 | 21.0% | M vs. L | 0.82 (0.39,1.74) | 0.606 |
| | | | Normal | 117 | 87.3% | 131 | 89.7% | 94 | 79.0% | H vs. L | 1.67 (0.83,3.33) | 0.148 |
| | | Black | n | 14 | | 14 | | 12 | | | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 6 | 42.9% | 3 | 21.4% | 1 | 8.3% | M vs. L | 0.31 (0.06,1.70) | 0.179 |
| | | | Normal | 8 | 57.1% | 11 | 78.6% | 11 | 91.7% | H vs. L | 0.10 (0.01,1.02) | 0.052 |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Exposure Index Medium | | Exposure Index High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hysteria | Exposure Index-by-Education (Officer) | High School | n | 11 | | 17 | | 24 | | Overall | | 0.129* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 2 | 18.2% | 2 | 11.8% | 0 | 0.0% | M vs. L | 0.60 (0.07,5.03)* | 0.999* |
| | | | Normal | 9 | 81.8% | 15 | 88.2% | 24 | 100.0% | H vs. L | 0.08 (0.003,1.77)** | 0.092* |
| | | College(b) | n | 116 | | 113 | | 99 | | Overall | | 0.025 |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 5 | 4.3% | 7 | 6.2% | 14 | 14.1% | M vs. L | 1.17 (0.35,3.92) | 0.795 |
| | | | Normal | 111 | 95.7% | 106 | 93.8% | 85 | 85.9% | H vs. L | 3.49 (1.17,10.32) | 0.024 |
| Hysteria | Exposure Index-by-Race (Enlisted Groundcrew) | Nonblack | n | 138 | | 149 | | 128 | | Overall | | 0.029* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 23 | 16.7% | 13 | 8.7% | 25 | 19.5% | M vs. L | 0.48 (0.23,0.99)* | 0.050* |
| | | | Normal | 115 | 83.3% | 136 | 91.3% | 103 | 80.5% | H vs. L | 1.21 (0.65,2.27)* | 0.633* |
| | | Black | n | 16 | | 14 | | 13 | | Overall | | 0.094* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 5 | 31.2% | 3 | 21.4% | 0 | 0.0% | M vs. L | 0.60 (0.11,3.15)* | 0.689* |
| | | | Normal | 11 | 68.8% | 11 | 78.6% | 13 | 100.0% | H vs. L | 0.08 (0.004,1.56)** | 0.048* |
| Mania/ Hypomania | Exposure Index-by-Drink-years (Officer) | 0 | n | 5 | | 0 | | 6 | | Overall | | — |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 0 | 0.0% | — | | 0 | 0.0% | M vs. L | — | — |
| | | | Normal | 5 | 100.0% | — | | 6 | 100.0% | H vs. L | — | — |
| | | 0-50 | n | 105 | | 109 | | 92 | | Overall | | 0.207* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 8 | 7.6% | 5 | 4.6% | 2 | 2.2% | M vs. L | 0.58 (0.18,1.84)* | 0.402* |
| | | | Normal | 97 | 92.4% | 104 | 95.4% | 90 | 97.8% | H vs. L | 0.27 (0.06,1.30)* | 0.108* |
| | | >50 | n | 15 | | 18 | | 22 | | Overall | | 0.016* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 0 | 0.0% | 0 | 0.0% | 5 | 22.7% | M vs. L | — | — |
| | | | Normal | 15 | 100.0% | 18 | 100.0% | 17 | 77.3% | H vs. L | 9.74 (0.50,190.8)** | 0.067* |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Medium | | High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Masculinity/ Femininity | Exposure Index-by-Education (Officer) | High School | n | 11 | | 16 | | 24 | | | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 1 | 9.1% | 4 | 25.0% | 1 | 4.2% | M vs. L | 5.96 (0.53,67.59) | 0.150 |
| | | | Normal | 10 | 90.9% | 12 | 75.0% | 23 | 95.8% | H vs. L | 0.33 (0.02,6.55) | 0.467 |
| | | College | n | 114 | | 110 | | 96 | | | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 6 | 5.3% | 11 | 10.0% | 13 | 13.5% | M vs. L | 3.03 (1.01,9.08) | 0.048 |
| | | | Normal | 108 | 94.7% | 99 | 90.0% | 83 | 86.5% | H vs. L | 4.48 (1.49,13.44) | 0.008 |
| Paranoia | Exposure Index-by-Age (Officer) | Born >=1942 | n | 43 | | 22 | | 11 | | Overall | | 0.288* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 0 | 0.0% | 1 | 4.5% | 0 | 0.0% | M vs. L | 6.07 (0.24,155.30)** | 0.338* |
| | | | Normal | 43 | 100.0% | 21 | 95.5% | 11 | 100.0% | H vs. L | — | — |
| | | Born <1942 | n | 84 | | 108 | | 112 | | Overall | | 0.106* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 1 | 1.2% | 0 | 0.0% | 4 | 3.6% | M vs. L | 0.26 (0.01,6.38)** | 0.437* |
| | | | Normal | 83 | 98.8% | 108 | 100.0% | 108 | 96.4% | H vs. L | 3.07 (0.34,28.02)* | 0.394* |
| Paranoia | Exposure Index-by-Age (Enlisted Flyer) | Born ≥1942 | n | 11 | | 18 | | 9 | | Overall | | 0.565* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 0 | 0.0% | 1 | 5.6% | 0 | 0.0% | M vs. L | 1.97 (0.07,52.71)** | 0.999* |
| | | | Normal | 11 | 100.0% | 17 | 94.4% | 9 | 100.0% | H vs. L | — | — |
| | | Born <1942 | n | 43 | | 47 | | 48 | | Overall | | 0.195* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 3 | 7.0% | 0 | 0.0% | 3 | 6.3% | M vs. L | 0.12 (0.01,2.43)** | 0.105* |
| | | | Normal | 40 | 93.0% | 47 | 100.0% | 45 | 93.7% | H vs. L | 0.89 (0.17,4.66)* | 0.999* |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Medium | | High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Paranoia | Exposure Index-by-Race (Enlisted Groundcrew) | Nonblack | n | 138 | | 149 | | 128 | | Overall | | 0.348* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 3 | 2.2% | 5 | 3.4% | 7 | 5.5% | M vs. L | 1.56 (0.37,6.66)* | 0.724 |
| | | | Normal | 135 | 97.8% | 144 | 96.6% | 121 | 94.5% | H vs. L | 2.60 (0.66,10.30)* | 0.204* |
| | | Black | n | 16 | | 14 | | 13 | | Overall | | 0.422* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 2 | 12.5% | 1 | 7.1% | 0 | 0.0% | M vs. L | 0.54 (0.04,6.67)* | 0.999* |
| | | | Normal | 14 | 87.5% | 13 | 92.9% | 13 | 100.0% | H vs. L | 0.22 (0.01,4.89)** | 0.488* |
| Psychopathic/ Deviate | Exposure Index-by-Education (Enlisted Groundcrew) | High School | n | 110 | | 131 | | 108 | | Overall | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 16 | 14.5% | 15 | 11.5% | 24 | 22.2% | M vs. L | 0.75 (0.35,1.64) | 0.475 |
| | | | Normal | 94 | 85.5% | 116 | 88.5% | 84 | 77.8% | H vs. L | 1.50 (0.72,3.09) | 0.278 |
| | | College | n | 38 | | 29 | | 23 | | Overall | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 8 | 21.1% | 3 | 10.3% | 1 | 4.3% | M vs. L | 0.52 (0.12,2.23) | 0.377 |
| | | | Normal | 30 | 78.9% | 26 | 89.7% | 22 | 95.7% | H vs. L | 0.12 (0.01,1.11) | 0.062 |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | Medium | High | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Total CMI | Exposure Index-by-Drink-years (Officer Enlisted) | 0 | n | 5 | 0 | 6 | M vs. L | (c) | — |
| | | | Adj. Mean | 4.01 | — | 6.87 | M vs. L | (c) | 0.228 |
| | | | 95% C.I. | (1.77, 8.06) | — | (3.57, (12.53) | | | |
| | | 0-50 | n | 104 | 107 | 92 | M vs. L | (c) | 0.964 |
| | | | Adj. Mean | 6.95 | 6.98 | 8.40 | H vs. L | (c) | 0.058 |
| | | | 95% C.I. | (5.10, 9.37) | (5.13, 9.39) | (6.19, 11.29) | | | |
| | | >50 | n | 15 | 17 | 22 | M vs. L | (c) | 0.007 |
| | | | Adj. Mean | 13.74 | 7.17 | 9.27 | H vs. L | (c) | 0.080 |
| | | | 95% C.I. | (8.91, 20.92) | (4.68, 10.75) | (6.34, 13.36) | | | |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | Exposure Index Medium | Exposure Index High | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Total CMI | Exposure Index-by-Education | High School 0 | n | 2 | 4 | 4 | M vs. L | (c) | 0.018 |
| | | | Adj. Mean | 4.00 | 17.79 | 11.32 | M vs. L | (c) | 0.106 |
| | | | 95% C.I. | (1.01,11.48) | (8.68,35.49) | (5.31, 23.09) | | | |
| | | High School 0-50 | n | 25 | 36 | 27 | M vs. L | (c) | 0.191 |
| | | | Adj. Mean | 16.06 | 12.68 | 10.87 | M vs. L | (c) | 0.045 |
| | | | 95% C.I. | (11.23,22.81) | (9.27,17.23) | (7.82, 14.97) | | | |
| | | High School >50 | n | 14 | 10 | 11 | M vs. L | (c) | 0.509 |
| | | | Adj. Mean | 16.32 | 19.64 | 18.27 | M vs. L | (c) | 0.680 |
| | | | 95% C.I. | (10.59,24.87) | (12.38,30.85) | (11.68, 28.27) | | | |
| | Exposure Index-by-Drink-Years (Enlisted Flyer) | College 0 | n | 1 | 1 | 0 | M vs. L | (c) | 0.049 |
| | | | Adj. Mean | 0.84 | 10.17 | — | M vs. L | (c) | — |
| | | | 95% C.I. | (0,5.66) | (2.13,38.86) | — | | | |
| | | College 0-50 | n | 6 | 10 | 8 | M vs. L | (c) | 0.100 |
| | | | Adj. Mean | 6.43 | 11.84 | 11.92 | M vs. L | (c) | 0.112 |
| | | | 95% C.I. | (3.25,11.97) | (7.33,18.81) | (7.06 19.72) | | | |
| | | College >50 | n | 0 | 0 | 1 | M vs. L | (c) | — |
| | | | Adj. Mean | — | — | 20.55 | M vs. L | (c) | — |
| | | | 95% C.I. | — | — | (5.04, 75.84) | | | |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Medium | | High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-R Subscore | Exposure Index-by-Drink-years (Enlisted Flyer | 0 | n | 3 | | 5 | | 4 | | Overall | | 0.060* |
| | | | Number/% | | | | | | | | | |
| | | | >0 | 0 | 0.0% | 4 | 80.0% | 3 | 75.0% | M vs. L | 21.00 (0.64,690.0)** | 0.143* |
| | | | 0 | 3 | 100.0% | 1 | 20.0% | 1 | 25.0% | H vs. L | 16.33 (0.48,555.6)** | 0.143* |
| | | 0-50(a) | n | 31 | | 46 | | 35 | | Overall | | 0.054 |
| | | | Number/% | | | | | | | | | |
| | | | >0 | 12 | 38.7% | 25 | 54.3% | 10 | 28.6% | M vs. L | 1.98 (0.77,5.09) | 0.158 |
| | | | 0 | 19 | 61.3% | 21 | 45.7% | 25 | 71.4% | H vs. L | 0.65 (0.23,1.83) | 0.410 |
| | | >50(a) | n | 14 | | 10 | | 12 | | Overall | | 0.440 |
| | | | Number/% | | | | | | | | | |
| | | | >0 | 7 | 50.0% | 5 | 50.0% | 9 | 75.0% | M vs. L | 1.00 (0.20,5.07) | 1.000 |
| | | | 0 | 7 | 50.0% | 5 | 50.0% | 3 | 25.0% | H vs. L | 2.67 (0.49,14.46) | 0.255 |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Exposure Index Medium | | Exposure Index High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-H Area Subscore | Exposure Index-by-Education | High School 0 Drink-years | n | 2 | | 4 | | 4 | | Overall | | 0.007* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 0 | 0.0 | 4 | 100.0 | 4 | 100.0 | M vs. L | 45.00 (0.67,3043)** | 0.067* |
| | | | Normal | 2 | 100.0 | 0 | 0.0 | 0 | 0.0 | H vs. L | 45.00 (0.67,3043)** | 0.067* |
| | | High School 0-50 Drink-years | n | 22 | | 33 | | 22 | | Overall | | 0.035* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 18 | 81.8 | 18 | 54.5 | 10 | 45.5 | M vs. L | 0.27 (0.07,0.96)* | 0.047* |
| | | | Normal | 4 | 18.2 | 15 | 45.5 | 12 | 54.5 | Y vs. L | 0.19 (0.05,0.73)* | 0.027* |
| | | High School >50 Drink-years | n | 14 | | 9 | | 11 | | Overall | | 0.583* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 10 | 71.4 | 8 | 88.9 | 9 | 81.8 | M vs. L | 3.20 (0.30,34.59)* | 0.611* |
| | | | Normal | 4 | 28.6 | 1 | 11.1 | 2 | 18.2 | H vs. L | 1.80 (0.26,12.30)* | 0.661* |
| | Index-by-Drink-years (Enlisted Flyer) | Exposure 0 Drink-years | College | n | 0 | | 1 | | 1 | | Overall | — |
| | | | Abnormal | 0 | — | 0 | 0.0 | 0 | 0.0 | M vs. L | — | — |
| | | | Normal | 0 | — | 1 | 100.0 | 1 | 100.0 | H vs. L | — | — |
| | | College 0-50 Drink-years | n | 6 | | 10 | | 7 | | Overall | | 0.115* |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 1 | 16.7 | 6 | 60.0 | 5 | 71.4 | M vs. L | 7.50 (0.62,90.65)* | 0.145* |
| | | | Normal | 5 | 83.3 | 4 | 40.0 | 2 | 28.6 | H vs. L | 12.50 (0.84,186.30)* | 0.103* |
| | | College >50 Drink-years | n | 0 | | 0 | | 1 | | Overall | | — |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 0 | — | 0 | — | 1 | 100.0 | M vs. L | — | — |
| | | | Normal | 0 | — | 0 | — | 0 | 0.0 | H vs. L | — | — |

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

| Variable | Interaction (Occupation) | Stratification | Statistic | Exposure Index Low | | Medium | | High | | Contrast | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HRB Impairment Index | Exposure Index-by-Race (Enlisted Groundcrew) | Nonblack | n | 132 | | 144 | | 115 | | | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 48 | 36.4% | 59 | 41.0% | 40 | 34.8% | M vs. L | 1.88 (1.09,3.25) | 0.024 |
| | | | Normal | 84 | 63.6% | 85 | 59.0% | 75 | 65.2% | H vs. L | 0.77 (0.43,1.40) | 0.400 |
| | | Black | n | 13 | | 14 | | 12 | | | | |
| | | | Number/% | | | | | | | | | |
| | | | Abnormal | 11 | 84.6% | 10 | 71.4% | 3 | 25.0% | M vs. L | 0.39 (0.05,2.72) | 0.340 |
| | | | Normal | 2 | 15.4% | 4 | 28.6% | 9 | 75.0% | H vs. L | 0.06 (0.01,0.44) | 0.006 |

*Unadjusted estimate of relative risk and confidence interval, or p-value, based on stratified tables.

**Unadjusted estimate of relative risk and confidence interval calculated after adding 0.5 to each cell.

(a)Results have been adjusted for education.

(b)Results have been adjusted for age.

—Zero counts in cells do not allow for calculation of percent, relative risk, confidence interval, or p-value.

(c)No relative risk given for total CMI, which was analyzed continuously.

Note: Small sample sizes may affect validity of overall p-value.

Note: Results without (*) or (**) are adjusted for all other main effects in model (age, race, education, drink-years, and combat index [for MMPI variables]), unless otherwise noted.

Note: Participants judged to have PTSD are eliminated from analysis of Total CMI, Section M-R Subscore, Section A-H Area Subscore, and HRB Impairment Index.

TABLE J-8.

**Unadjusted Analyses for Reported Psychological Illnesses by Group: Baseline and First Followup Studies Combined* (Original Comparisons Only)**

| Type of Illness | Group Abnormalities | | | | Total | p-Value** |
|---|---|---|---|---|---|---|
| | Ranch Hand | | Original Comparison | | | |
| | Number | Percent | Number | Percent | | |
| Psychoses | 14 | 1.4 | 8 | 0.8 | 22 | 0.289 |
| Alcohol Dependence | 9 | 0.9 | 4 | 0.4 | 13 | 0.268 |
| Anxiety | 7 | 0.7 | 8 | 0.8 | 15 | 0.798 |
| Other Neuroses | 72 | 7.1 | 46 | 4.8 | 118 | 0.037 |

*Analyses based on 1,016 Ranch Hands and 955 Original Comparisons; some participants had more than one illness.

**Fisher's exact test.

TABLE J-9.

**Summary of Kolmogorov-Smirnov Tests on MMPI for Officers (Original Comparisons Only)**

| Parameter* | Group | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|
| Anxiety | Ranch Hand | 52.82 | 7.38 | 0.328 |
| | Original Comparison | 53.22 | 7.06 | |
| Consistency | Ranch Hand | 49.23 | 6.92 | 0.995 |
| | Original Comparison | 49.02 | 5.50 | |
| Defensiveness | Ranch Hand | 49.64 | 6.64 | 0.822 |
| | Original Comparison | 49.69 | 7.14 | |
| Denial | Ranch Hand | 59.47 | 7.31 | 0.901 |
| | Original Comparison | 59.46 | 7.40 | |
| Depression | Ranch Hand | 55.11 | 10.17 | 0.975 |
| | Original Comparison | 54.86 | 9.38 | |
| Hypochondria | Ranch Hand | 55.60 | 8.85 | 0.990 |
| | Original Comparison | 54.96 | 8.09 | |
| Hysteria | Ranch Hand | 60.45 | 7.00 | 0.711 |
| | Original Comparison | 59.79 | 6.81 | |
| Mania/Hypomania | Ranch Hand | 54.36 | 8.94 | 0.436 |
| | Original Comparison | 53.68 | 9.10 | |
| Masculinity/ Femininity | Ranch Hand | 58.83 | 8.64 | 0.577 |
| | Original Comparison | 58.14 | 8.94 | |
| Paranoia | Ranch Hand | 53.71 | 7.34 | 0.995 |
| | Original Comparison | 53.57 | 6.86 | |
| Psychopathic/ Deviate | Ranch Hand | 56.82 | 8.87 | 0.644 |
| | Original Comparison | 56.61 | 9.65 | |
| Schizophrenia | Ranch Hand | 54.80 | 8.48 | 0.661 |
| | Original Comparison | 54.66 | 7.89 | |
| Social Introversion | Ranch Hand | 46.56 | 7.43 | 0.627 |
| | Original Comparison | 47.13 | 7.60 | |
| Validity | Ranch Hand | 0.93 | 3.11 | 0.594 |
| | Original Comparison | 0.80 | 2.86 | |

*n=380 Ranch Hands; n=350 Original Comparisons.

TABLE J-10.

**Summary of Kolmogorov-Smirnov Tests on MMPI for Enlisted Flyers (Original Comparisons Only)**

| Parameter* | Group | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|
| Anxiety | Ranch Hand | 54.78 | 9.73 | 0.993 |
| | Original Comparison | 54.16 | 8.78 | |
| Consistency | Ranch Hand | 52.24 | 10.30 | 0.923 |
| | Original Comparison | 51.41 | 8.15 | |
| Defensiveness | Ranch Hand | 53.05 | 7.96 | 0.353 |
| | Original Comparison | 52.09 | 8.34 | |
| Denial | Ranch Hand | 55.95 | 8.73 | 0.760 |
| | Original Comparison | 56.81 | 8.44 | |
| Depression | Ranch Hand | 58.21 | 11.79 | 0.760 |
| | Original Comparison | 57.27 | 10.35 | |
| Hypochondria | Ranch Hand | 58.48 | 12.16 | 0.577 |
| | Original Comparison | 58.44 | 11.71 | |
| Hysteria | Ranch Hand | 60.00 | 8.94 | 0.465 |
| | Original Comparison | 60.70 | 8.77 | |
| Mania/Hypomania | Ranch Hand | 55.05 | 10.00 | 0.155 |
| | Original Comparison | 55.50 | 9.42 | |
| Masculinity/ Femininity | Ranch Hand | 55.79 | 7.85 | 0.877 |
| | Original Comparison | 56.22 | 8.39 | |
| Paranoia | Ranch Hand | 52.77 | 8.43 | 0.877 |
| | Original Comparison | 51.72 | 7.68 | |
| Psychopathic/ Deviate | Ranch Hand | 57.48 | 11.40 | 0.163 |
| | Original Comparison | 57.85 | 9.72 | |
| Schizophrenia | Ranch Hand | 56.56 | 13.03 | 0.496 |
| | Original Comparison | 56.27 | 10.59 | |
| Social Introversion | Ranch Hand | 50.35 | 8.89 | 0.194 |
| | Original Comparison | 49.00 | 7.94 | |
| Validity | Ranch Hand | 3.93 | 42.48 | 0.864 |
| | Original Comparison | 7.18 | 60.31 | |

*n=176 Ranch Hands; n=172 Original Comparisons (except for validity, where n=177 Ranch Hands and n=174 Original Comparisons).

**TABLE J-11.**

**Summary of Kolmogorov-Smirnov Tests on MMPI for Enlisted Groundcrew (Original Comparisons Only)**

| Parameter* | Group | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|
| Anxiety | Ranch Hand | 55.86 | 10.96 | 0.877 |
| | Original Comparison | 55.72 | 9.34 | |
| Consistency | Ranch Hand | 53.05 | 10.64 | 0.728 |
| | Original Comparison | 51.78 | 8.19 | |
| Defensiveness | Ranch Hand | 52.42 | 8.27 | 0.923 |
| | Original Comparison | 52.69 | 8.51 | |
| Denial | Ranch Hand | 55.53 | 8.57 | 0.112 |
| | Original Comparison | 56.80 | 8.72 | |
| Depression | Ranch Hand | 58.79 | 12.98 | 0.661 |
| | Original Comparison | 57.85 | 10.63 | |
| Hypochondria | Ranch Hand | 58.44 | 13.22 | 0.577 |
| | Original Comparison | 57.50 | 11.30 | |
| Hysteria | Ranch Hand | 60.36 | 9.80 | 0.644 |
| | Original Comparison | 59.75 | 8.84 | |
| Mania/Hypomania | Ranch Hand | 55.26 | 9.78 | 0.822 |
| | Original Comparison | 55.69 | 9.72 | |
| Masculinity/ Femininity | Ranch Hand | 56.18 | 8.24 | 0.304 |
| | Original Comparison | 57.24 | 8.49 | |
| Paranoia | Ranch Hand | 53.12 | 9.05 | 0.340 |
| | Original Comparison | 53.73 | 8.48 | |
| Psychopathic/ Deviate | Ranch Hand | 59.01 | 11.29 | 0.644 |
| | Original Comparison | 59.34 | 10.70 | |
| Schizophrenia | Ranch Hand | 58.20 | 14.22 | 0.328 |
| | Original Comparison | 57.58 | 10.64 | |
| Social Introversion | Ranch Hand | 51.86 | 9.82 | 0.353 |
| | Original Comparison | 50.99 | 8.63 | |
| Validity | Ranch Hand | 1.97 | 26.48 | 0.999 |
| | Original Comparison | 0.97 | 5.41 | |

*n=458 Ranch Hands; n=430 Original Comparisons (except for validity, where n=459 Ranch Hands and n=431 Original Comparisons).

TABLE J-12.

Summary of Kolmogorov-Smirnov Tests on CMI
(Original Comparisons Only)

| Stratification | Group | Sample Size | Mean Score | Standard Deviation | Kolmogorov-Smirnov p-Value |
|---|---|---|---|---|---|
| Age | | | | | |
| Born ≥1942 | Ranch Hand | 402 | 15.88 | 15.21 | <0.001 |
| | Original Comparison | 366 | 12.95 | 11.57 | |
| Born 1923-1941 | Ranch Hand | 562 | 15.49 | 12.99 | 0.776 |
| | Original Comparison | 528 | 14.55 | 11.88 | |
| Born ≤1922 | Ranch Hand | 36 | 18.56 | 15.94 | 0.980 |
| | Original Comparison | 45 | 16.47 | 9.28 | |
| Race | | | | | |
| Nonblack | Ranch Hand | 941 | 15.63 | 13.83 | 0.038 |
| | Original Comparison | 882 | 13.96 | 11.47 | |
| Black | Ranch Hand | 59 | 17.81 | 16.91 | 0.561 |
| | Original Comparison | 57 | 14.82 | 14.62 | |
| Education | | | | | |
| High School | Ranch Hand | 556 | 18.88 | 15.80 | <0.001 |
| | Original Comparison | 524 | 15.62 | 13.12 | |
| College | Ranch Hand | 444 | 11.85 | 10.18 | 0.577 |
| | Original Comparison | 415 | 11.99 | 9.16 | |
| Current Alcohol Use | | | | | |
| Drinker | Ranch Hand | 851 | 15.16 | 13.12 | 0.170 |
| | Original Comparison | 812 | 13.77 | 11.32 | |
| Nondrinker | Ranch Hand | 148 | 18.84 | 17.71 | 0.162 |
| | Original Comparison | 127 | 15.61 | 13.69 | |
| Occupation | | | | | |
| Officer | Ranch Hand | 377 | 11.23 | 9.01 | 0.970 |
| | Original Comparison | 345 | 10.99 | 7.53 | |
| Enlisted Flyer | Ranch Hand | 174 | 17.72 | 14.84 | 0.270 |
| | Original Comparison | 170 | 15.31 | 12.51 | |
| Enlisted Groundcrew | Ranch Hand | 449 | 18.80 | 16.06 | 0.003 |
| | Original Comparison | 424 | 15.96 | 13.48 | |

**TABLE J-13.**

**Unadjusted Analyses for MMPI by Group (Original Comparisons Only)**

| Variable | Statistic | Group: Ranch Hand Number | Ranch Hand Percent | Original Comparison Number | Original Comparison Percent | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|
| Anxiety | n | 1,014 | | 952 | | | |
| | Abnormal | 73 | 7.2 | 49 | 5.1 | 1.43 (0.98,2.08) | 0.062 |
| | Normal | 941 | 92.8 | 903 | 94.9 | | |
| Consistency | n | 1,014 | | 952 | | | |
| | Abnormal | 36 | 3.6 | 22 | 2.3 | 1.56 (0.91,2.67) | 0.111 |
| | Normal | 978 | 96.4 | 930 | 97.7 | | |
| Defensiveness | n | 1,014 | | 952 | | | |
| | Abnormal | 23 | 2.3 | 30 | 3.2 | 0.71 (0.41,1.24) | 0.265 |
| | Normal | 991 | 97.7 | 922 | 96.8 | | |
| Denial | n | 1,014 | | 952 | | | |
| | Abnormal | 17 | 1.7 | 37 | 3.9 | 0.42 (0.24,0.75) | 0.003 |
| | Normal | 997 | 98.3 | 915 | 96.1 | | |
| Depression | n | 1,014 | | 952 | | | |
| | Abnormal | 114 | 11.2 | 87 | 9.1 | 1.26 (0.94,1.69) | 0.136 |
| | Normal | 900 | 88.8 | 865 | 90.9 | | |
| Hypochondria | n | 1,014 | | 952 | | | |
| | Abnormal | 119 | 11.7 | 91 | 9.6 | 1.26 (0.94,1.68) | 0.125 |
| | Normal | 895 | 88.3 | 861 | 90.4 | | |
| Hysteria | n | 1,014 | | 952 | | | |
| | Abnormal | 123 | 12.1 | 89 | 9.4 | 1.34 (1.00,1.79) | 0.050 |
| | Normal | 891 | 87.9 | 863 | 90.6 | | |

**TABLE J-13. (continued)**

**Unadjusted Analyses for MMPI by Group**
**(Original Comparisons Only)**

| Variable | Statistic | Group: Ranch Hand Number | Ranch Hand Percent | Original Comparison Number | Original Comparison Percent | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|
| Mania/Hypomania | n | 1,014 | | 952 | | | |
| | Abnormal | 63 | 6.2 | 56 | 5.9 | 1.06 (0.73,1.54) | 0.777 |
| | Normal | 951 | 93.8 | 896 | 94.1 | | |
| Masculinity/ Femininity | n | 1,014 | | 952 | | | |
| | Abnormal | 66 | 6.5 | 83 | 8.7 | 0.73 (0.52,1.02) | 0.073 |
| | Normal | 948 | 93.5 | 869 | 91.3 | | |
| Paranoia | n | 1,014 | | 952 | | | |
| | Abnormal | 31 | 3.1 | 17 | 1.8 | 1.73 (0.95,3.16) | 0.079 |
| | Normal | 983 | 96.9 | 935 | 98.2 | | |
| Psychopathic/ Deviate | n | 1,014 | | 952 | | | |
| | Abnormal | 120 | 11.8 | 104 | 10.9 | 1.09 (0.83,1.45) | 0.570 |
| | Normal | 894 | 88.2 | 848 | 89.1 | | |
| Schizophrenia | n | 1,014 | | 952 | | | |
| | Abnormal | 94 | 9.3 | 71 | 7.5 | 1.27 (0.92,1.75) | 0.166 |
| | Normal | 920 | 90.7 | 881 | 92.5 | | |
| Social Introversion | n | 1,014 | | 952 | | | |
| | Abnormal | 26 | 2.6 | 14 | 1.5 | 1.76 (0.92,3.40) | 0.109 |
| | Normal | 988 | 97.4 | 938 | 98.5 | | |
| Validity | n | 1,016 | | 955 | | | |
| | >0 | 224 | 22.0 | 198 | 20.7 | 1.08 (0.87,1.34) | 0.510 |
| | 0 | 792 | 78.0 | 757 | 79.3 | | |

**TABLE J-14.**

**Adjusted Analyses for MMPI by Group (Original Comparisons Only)**

| Variable | Group: Ranch Hand Total | Group: Original Comparison Total | Adj. Relative Risk (95% C.I.) | p-Value | Covariate Remarks* |
|---|---|---|---|---|---|
| Anxiety | 1,012 | 950 | 1.39 (0.95,2.05) | 0.092 | EDUC (p<0.001)<br>AGE*CI (p=0.010) |
| Consistency | 976 | 926 | **** | **** | AGE (p=0.025)<br>RACE*DRKYR (p=0.024)<br>GRP*EDUC (p=0.034) |
| Defensiveness | 976 | 926 | 0.68 (0.38,1.19) | 0.175 | EDUC (p<0.001)<br>AGE*DRKYR (p=0.043) |
| Denial | 974 | 924 | 0.43 (0.23,0.80) | 0.006 | AGE*DRKYR (p=0.026)<br>EDUC*CI (p=0.040) |
| Depression | 1,014 | 952 | 1.26 (0.94,1.70) | 0.120 | EDUC (p<0.001) |
| Hypochondria | 1,014 | 952 | 1.29 (0.96,1.72) | 0.091 | AGE (p=0.005)<br>EDUC (p<0.001) |
| Hysteria | 1,014 | 952 | 1.37 (1.02,1.83) | 0.033 | AGE (p=0.001)<br>EDUC (p<0.001) |
| Mania/Hypomania | 974 | 924 | 0.97 (0.66,1.43) | 0.882 | AGE (p=0.048)<br>CI (p=0.010)<br>DRKYR (p=0.016) |

TABLE J-14. (continued)

Adjusted Analyses for MMPI by Group
(Original Comparisons Only)

| Variable | Group: Ranch Hand Total | Group: Original Comparison Total | Adj. Relative Risk (95% C.I.) | p-Value | Covariate Remarks* |
|---|---|---|---|---|---|
| Masculinity/ Femininity | 1,014 | 952 | 0.71 (0.51,1.00) | 0.047 | EDUC ($p<0.001$)<br>RACE*AGE ($p=0.006$) |
| Paranoia | 1,012 | 950 | **** | **** | AGE*CI ($p=0.004$)<br>GRP*AGE ($p=0.040$) |
| Psychopathic/ Deviate | 974 | 924 | 1.13 (0.84,1.52) | 0.433 | EDUC ($p=0.010$)<br>AGE*CI ($p\geq0.001$)<br>RACE*DRKYR ($p=0.001$) |
| Schizophrenia | 976 | 926 | 1.27 (0.91,1.77) | 0.153 | EDUC ($p<0.001$)<br>RACE*DRKYR ($p=0.003$) |
| Social Introversion | 1,014 | 952 | 1.72 (0.89,3.31) | 0.099 | AGE ($p=0.005$) |
| Validity | 1,014 | 953 | **** | **** | AGE*CI ($p=0.034$)<br>GRP*RACE ($p=0.016$)<br>GRP*CI ($p=0.030$) |

*Abbreviations:

EDUC: education
CI: combat index
DRKYR: drink-years
GRP: group

****Group-by-covariate interaction: adjusted relative risk, confidence interval, and p-value are not presented.

**TABLE J-15.**

**Unadjusted Analyses for the Cornell Medical Index (CMI) by Group (Original Comparisons Only)**

| Variable | Statistic | Group: Ranch Hand | | Group: Original Comparison | | Est. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|
| Total CMI | n | 1,000 | | 939 | | | |
| | Mean* | 11.74 | | 10.55 | | -- | 0.004 |
| | 95% C.I.* | (11.17,12.35) | | (10.02,11.11) | | | |
| M-R Subscore | n | 998 | | 936 | | Overall | 0.198 |
| Subscore | Number/% | | | | | | |
| | 0 (Low) | 538 | 53.9% | 531 | 56.7% | Medium vs. Low | |
| | 1-10 (Medium) | 408 | 40.9% | 370 | 39.5% | 1.09 (0.91,1.31) | 0.371 |
| | >10 (High) | 52 | 5.2% | 35 | 3.8% | High vs. Low | |
| | | | | | | 1.47 (0.99,2.29) | 0.095 |
| A-H Area | n | 914 | | 1,148 | | Overall | 0.106 |
| Subscore | Number/% | | | | | | |
| | 0 (Low) | 360 | 39.4% | 375 | 44.1% | Medium vs. Low | |
| | 1-3 (Medium) | 449 | 49.1% | 394 | 46.3% | 1.19 (0.97,1.45) | 0.090 |
| | 4-8 (High) | 105 | 11.5% | 82 | 9.6% | High vs. Low | |
| | | | | | | 1.33 (0.97,1.84) | 0.086 |

*Transformed from log (X+1) scale, where X was the number of questions answered "yes."

--No relative risk given for Total CMI, which was analyzed as a continuous variable.

**TABLE J-16.**

**Adjusted Analyses for CMI Variables by Group (Original Comparisons Only)**

| Variable | Statistic | Group: Ranch Hand | Group: Original Comparison | Adj. Relative Risk (95% C.I.) | p-Value | Covariate Remarks* |
|---|---|---|---|---|---|---|
| Total CMI | n | 962 | 913 | | | PTSD (p<0.001) |
| | Adj. Mean | **** | **** | -- | **** | RACE*DRKYR (p=0.027) |
| | 95% C.I. | **** | **** | | | AGE*EDUC (p=0.010) |
| | | | | | | GRP*EDUC (p=0.002) |
| M-R Subscore | n | 998 | 935 | **** | **** | AGE (p<0.001) |
| | | | | | | PTSD (p<0.001) |
| | | | | | | GRP*EDUC (p=0.006) |
| A-H Area Subscore | n | 914 | 850 | Overall | 0.108 | AGE (p<0.001) |
| | | | | Medium vs. Low: | 0.063 | EDUC (p<0.001) |
| | | | | 1.20 (0.99,1.47) | 0.132 | PTSD (p<0.001) |
| | | | | High vs. Low: | | |
| | | | | 1.32 (0.92,1.89) | | |

****Group-by-covariate interaction -- adjusted mean/relative risk, confidence interval, and p-value are not presented.

--No relative risk given for total CMI, which was analyzed as a continuous variable.

*Additional Abbreviations:

PTSD: post-traumatic stress disorder

**TABLE J-17.**

**Summary Results for the Halstead-Reitan Battery Impairment Index Unadjusted and Adjusted Analyses (Original Comparisons Only)**

| Analysis | Statistic | Group: Ranch Hand Number | Ranch Hand Percent | Original Comparison Number | Original Comparison Percent | Est. Relative Risk (95% C.I). | p-Value | Covariate Remarks |
|---|---|---|---|---|---|---|---|---|
| Unadjusted Analysis | n | 1,006 | | 947 | | | | |
| | Abnormal | 348 | 34.6 | 319 | 33.7 | 1.04 (0.86,1.26) | 0.703 | |
| | Normal | 658 | 65.4 | 628 | 66.3 | | | |
| Adjusted Analysis | n | 1,006 | | 947 | | 1.10 (0.90,1.34) | 0.359 | AGE ($p<0.001$)<br>RACE ($p<0.001$)<br>EDUC ($p<0.001$) |

TABLE J-18.

Summary of Group-by-Covariate Interactions
for Psychological Variables
(Original Comparisons Only)

| Variable | Interaction | Stratification | Statistic | Group: Ranch Band | | Group: Original Comparison | | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Consistency | Group-by-Education | High School | n | 537 | | 516 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 30 | 5.6% | 13 | 2.5% | 2.31 (1.18,4.50) | 0.014 |
| | | | Normal | 507 | 94.4% | 503 | 97.5% | | |
| | | College | n | 437 | | 585 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 6 | 1.4% | 15 | 2.6% | 0.61 (0.22,1.74) | 0.359 |
| | | | Normal | 431 | 98.6% | 570 | 97.4% | | |
| Paranoia | Group-by-Age | Born ≥1942 | n | 410 | | 545 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 15 | 3.7% | 19 | 3.5% | 0.96 (0.44,2.13) | 0.927 |
| | | | Normal | 395 | 96.3% | 526 | 96.5% | | |
| | | Born <1942 | n | 602 | | 740 | | | |
| | | | Number/% | | | | | | |
| | | | Abnormal | 16 | 2.7% | 9 | 1.2% | 3.85 (1.36,10.94) | 0.011 |
| | | | Normal | 586 | 97.3% | 731 | 98.8% | | |

TABLE J-18. (continued)

Summary of Group-by-Covariate Interactions
for Psychological Variables
(Original Comparisons Only)

| Variable | Interaction | Stratification | Statistic | Group: Ranch Band | | Group: Original Comparison | | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Validity | Group-by-Race | Nonblack CI=Low | n | 178 | | 353 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 47 | 26.4% | 73 | 20.7% | 1.49 (0.98,2.26) | 0.059 |
| | | | 0 | 131 | 73.6% | 280 | 79.3% | | |
| | | Nonblack CI=Medium | n | 367 | | 295 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 78 | 21.3% | 43 | 14.6% | 1.60 (1.07,2.38) | 0.021 |
| | | | 0 | 289 | 78.7% | 252 | 85.4% | | |
| | | Nonblack CI=High | n | 409 | | 247 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 83 | 20.3% | 57 | 23.1% | 0.83 (0.57,1.20) | 0.319 |
| | | | 0 | 326 | 79.7% | 190 | 76.9% | | |
| | Group-by Combat Index | Black CI=Low | n | 20 | | 24 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 6 | 30.0% | 9 | 37.5% | 0.55 (0.24,1.29) | 0.170 |
| | | | 0 | 14 | 70.0% | 15 | 62.5% | | |
| | | Black CI=Medium | n | 18 | | 12 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 6 | 33.3% | 5 | 41.7% | 0.59 (0.25,1.41) | 0.239 |
| | | | 0 | 12 | 66.7% | 7 | 58.3% | | |
| | | Black CI=High | n | 22 | | 22 | | | |
| | | | Number/% | | | | | | |
| | | | >0 | 3 | 13.6% | 11 | 50.0% | 0.31 (0.13,0.71) | 0.006 |
| | | | 0 | 19 | 86.4% | 11 | 50.0% | | |

TABLE J-18. (continued)

Summary of Group-by-Covariate Interactions
for Psychological Variables
(Original Comparisons Only)

| Variable | Interaction | Stratification | Statistic | Group: Ranch Band | | Group: Original Comparison | | Adj. Relative Risk (95% C.I.) | p-Value |
|---|---|---|---|---|---|---|---|---|---|
| Total CMI | Group-by-Education | High School | n | 529 | | 511 | | — | <0.001 |
| | | | Adj. Mean* | 35.50 | | 29.65 | | | |
| | | | 95% C.I.* | (28.09,44.79) | | (23.27,37.70) | | | |
| | | College | n | 433 | | 402 | | — | 0.498 |
| | | | Adj. Mean* | 22.70 | | 23.49 | | | |
| | | | 95% C.I.* | (17.76,28.95) | | (18.37,29.97) | | | |
| M-R Subscore | Group-by-Education | High School | n | 555 | | 521 | | Overall | 0.015 |
| | | | Number/% | | | | | Med vs. Low | |
| | | | 0 (Low) | 246 | 44.3% | 281 | 53.9% | 1.42 (1.11,1.82) | 0.005 |
| | | | 1-10 (Med) | 267 | 48.1% | 213 | 40.9% | High vs. Low | |
| | | | >10 (High) | 42 | 7.6% | 27 | 5.2% | 1.51 (0.84,2.70) | 0.167 |
| | | College | n | 443 | | 414 | | Overall | 0.196 |
| | | | Number/% | | | | | Med vs. Low | |
| | | | 0 (Low) | 292 | 65.9% | 250 | 60.4% | 0.77 (0.58,1.02) | 0.071 |
| | | | 1-10 (Med) | 141 | 31.8% | 156 | 37.7% | High vs. Low | |
| | | | >10 (High) | 10 | 2.3% | 8 | 1.9% | 0.99 (0.34,2.87) | 0.991 |

*Converted from log (X+1) scale, where X was the number of questions answered "yes".

—No relative risk given for Total CMI, which was analyzed as a continuous variable.