APPENDIX 3 (a)

Showing computations for r and t of two-cata - three-cata form for total sample (N 100)

B1 - N

$$rXY = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{100(208412) - (-1129)(-2612)}{\sqrt{[100(538336) - (-1129)^2][100(483979) - (-2612)^2]}}$$

$$= \frac{17892252}{49764385}$$

$$= 0.3595$$

B_2 - S

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\ 2} + \sigma M_2^{\ 2} - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(-12.29) - (-26.12)}{\sqrt{52.558959 + 47.123259 - 2(0.3595)(7.2498)(6.8644)}}$$

$$= \frac{13.83}{\sqrt{63.9008}}$$

$$= \frac{13.83}{7.9937}$$

$$= 1.73$$

$\underline{B_2 - S}$

$$rXY = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{100(47806) - (754)(-800)}{\sqrt{[100(145026) - (754)^2][100(99102) - (-800)^2]}}$$

$$= \frac{4177400}{11363252}$$

$$= 0.3675$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\ 2} + \sigma M_2^{\ 2} - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(7.32) - (-8.00)}{\sqrt{42.9175 + 64.5096 - 2(.3675),(8.0316)(6.5513)}}$$

$$= \frac{15.32}{\sqrt{68.7428}}$$

$$= \frac{15.32}{8.2903}$$

$$= 1.848$$

$\underline{B_3 - I}$

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)\ (\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{100(92380) - (62)\ (-229)}{\sqrt{\left[100(182908) - (62)^2\right]\left[100(148293) - (-229)^2\right.}}$$

$$= \frac{9252199}{16448787.95}$$

$$= 0.5624$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1{}^2 + \sigma M_2{}^2 - 2\bar{r}\sigma M_1 \sigma M_2}}$$

$$= \frac{(.62) - (-2.29)}{\sqrt{18.2869 + 14.7968 - 2(0.5624)\ (4.2871)\ (3.8471)}}$$

$$= \frac{2.91}{\sqrt{18.55}}$$

$$= \frac{2.91}{4.307}$$

$$= .676$$

$\underline{B_4 - D}$

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)\ (\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{100(168246) - (4141)\ (1137)}{\sqrt{\left[100(356393) - (4141)^2\right]\left[100(198643) - (1137)^2\right]}}$$

$$= \frac{12116283}{18530851.86}$$

$$= 0.6538$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\ 2} + \sigma M_2^{\ 2} - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(41.43) - (11.37}{\sqrt{18.4914 + 18.57153 - 2(.6538)\ (4.299)\ (4.3093)}}$$

$$= \frac{30.06}{\sqrt{13.9502}}$$

$$= \frac{30.06}{3.7351}$$

$$= 8.05$$

$\underline{F_1 - C}$

$$rXY = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{100(394281) - (1646)(3290)}{\sqrt{[100(601324) - (1646)^2][100(536316) - (3290)^2]}}$$

$$= \frac{34012760}{507568272.06}$$

$$= 0.067$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2} - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(16.46) - (32.90)}{\sqrt{57.423084 + 42.8075 - 2(.067)(7.5776)(6.5430)}}$$

$$= \frac{16.44}{\sqrt{9.6747}}$$

$$= 1.58$$

$\underline{F_2 - S}$

$$rXY = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{m\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{100(1072) - (-276)(-1842)}{\sqrt{\left[100(126468) - (276)^2\right]\left[100(882344) - (-1842)^2\right]}}$$

$$= \frac{-401192}{31059829.2}$$

$$= -0.013$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2} - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(-2.76) - (-18.42)}{\sqrt{12.5706 + 84.8414 - 2(-.013)(3.5454)(9.2109)}}$$

$$= \frac{15.66}{\sqrt{98.2611}}$$

$$= \frac{15.66}{9.9126}$$

$$= 1.699$$

APPENDIX 3 (b)

Showing computations for r and t of two-cata and three-cata responseform for boys (N 50)

B1-N

$$r_{XY} = \frac{\left[N\Sigma XY - (\Sigma X)(\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{50(190864) - (-1933)(-2052)}{\sqrt{\left[50(298548) - (-1933)^2\right]\left[50(297329) - (-2052)^2\right]}}$$

$$= \frac{5576684}{10920050}$$

$$= .51$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(-38.66) - (-41.04)}{\sqrt{89.5273 + 85.2460 - 2(.51)(9.46)(9.23)}}$$

$$= \frac{2.38}{\sqrt{76.9796}}$$

$$= \frac{2.38}{8.77}$$

$$= 0.27$$

$\underline{B_2 - S}$

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)(\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{50(28435) - (743)(-79)}{\sqrt{\left[50(60259) - (743)^2\right]\left[50(36035) - (-79)^2\right]}}$$

$$= \frac{1480547}{2102089}$$

$$= .70$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2} - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(14.86) - (-1.58)}{\sqrt{19.6872 + 14.3641 - 2(.70)(4.44)(3.79)}}$$

$$= \frac{16.44}{\sqrt{10.4927}}$$

$$= \frac{16.44}{3.24}$$

$$= 5.07$$

B_3 - I

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)(\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{50(42348) - (-878)(-430)}{\sqrt{\left[50(89448) - (-878)^2\right]\left[50(90656) - (-430)^2\right]}}$$

$$= \frac{1739860}{4011710.0}$$

$$= .43$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\ 2} + \sigma M_2^{\ 2} - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(-17.56) - (-8.60)}{\sqrt{29.612 + 34.7832 - 2(.43)(5.44)(5.89)}}$$

$$= \frac{8.96}{\sqrt{36.8395}}$$

$$= \frac{8.96}{6.07}$$

$$= 1.48$$

$\underline{B_4 - D}$

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)(\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{50(110497) - (2916)(1261)}{\sqrt{\left[50(239258) - (2916)^2\right]\left[50(116735) - (1261)^2\right]}}$$

$$= \frac{1847774}{3833102}$$

$$= .48$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1{}^2 + \sigma M_2{}^2 - 2r\sigma M_1\sigma M_2}}$$

$$= \frac{(58.32) - (25.22)}{\sqrt{27.6788 + 33.9730 - 2(.48)(5.26)(5.83)}}$$

$$= \frac{33.10}{\sqrt{32.2126}}$$

$$= \frac{33.10}{5.68}$$

$$= 5.83$$

$\underline{F_1 - C}$

$$rXY = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{50(99381) - (-861)(190)}{\sqrt{[50(228381) - (861)^2][50(190228) - (190)^2]}}$$

$$= \frac{5132640}{10058562}$$

$$= .51$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1{}^2 + \sigma M_2{}^2 - 2r\sigma M_1\sigma M_2}}$$

$$= \frac{(-17.22) - (3.80)}{\sqrt{85.4218 + 75.8024 - 2(.51)(9.24)(8.71)}}$$

$$= \frac{21.02}{\sqrt{79.1342}}$$

$$= \frac{21.02}{8.89}$$

$$= 2.36$$

$\underline{F_2 - S}$

$$rXY = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{50(12101) - (-134)(-1341)}{\sqrt{[50(64544) - (-134)^2][50(372333) - (-134)^2]}}$$

$$= \frac{425356}{7346716}$$

$$= .05$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(-2.68) - (-26.82)}{\sqrt{25.6740 + 134.5470 - 2(.05)(5.06)(11.59)}}$$

$$= \frac{24.14}{\sqrt{154.3565}}$$

$$= \frac{24.14}{12.42}$$

$$= 1.94$$

APPENDIX . 3 (c)

Showing computations for r and t of two-cata and three-cata response form for girls (N 50)

B1 - N

$$rXY = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{50(17548) - (704)(-560)}{\sqrt{[50(239788) - (704)^2][50(186650) - (-560)^2]}}$$

$$= \frac{8435464}{10240628}$$

$$= 0.8$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(12.08) - (-11.20)}{\sqrt{91.95 + 72.15 - 2(.8)(9.50)(8.40)}}$$

$$= \frac{25.28}{\sqrt{164.10}}$$

$$= \frac{25.28}{36.42}$$

$$= .694$$

$\underline{B_2 - S}$

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)(\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{50(19371) - (-11)(-721)}{\sqrt{\left[50(84767)-(-11)^2\right]\left[50(63067) - (-721)^2\right]}}$$

$$= \frac{960619}{3340870.28}$$

$.29$

$$t_t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(-0.22) - (-14.22)}{\sqrt{\left[33.9058 + 21.0681 - 2(.29)(5.82)(4.59)\right.}}$$

$$= \frac{14.00}{\sqrt{39.4799}}$$

$$= \frac{14.00}{6.28}$$

$$= 2.23$$

B_3 - I

$$rXY = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{50(50032) - (940)(201)}{\sqrt{[50(93460) - (940)^2][50(5783) - (201)^2]}}$$

$$= \frac{2312660}{3293628}$$

$$= .70$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(18.80) - (4.02)}{\sqrt{30.3152 + 22.8116 - 2(.70)(5.51)(4.78)}}$$

$$= \frac{14.76}{\sqrt{16.2539}}$$

$$= \frac{14.76}{4.03}$$

$$= 3.67$$

$\underline{B_4 - D}$

$$r_{XY} = \frac{[N\Sigma XY - (\Sigma X)(\Sigma Y)]}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$= \frac{50(57749) - (1227)(-124)}{\sqrt{[50(117135) - (1227)^2][50(81908) - (-124)^2]}}$$

$$= \frac{2735302}{4213441}$$

$$= .64$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(24.54) - (-2.48)}{\sqrt{34.8098 + 32.6402 - (.64)(5.90)(5.71)}}$$

$$= \frac{27.02}{\sqrt{24.3281}}$$

$$= \frac{27.02}{4.93}$$

$$= 5.48$$

$\underline{F_1 - C}$

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)(\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{50(294900) - (2507)(3100)}{\sqrt{\left[50(372943) - (2507)^2\right]\left[50(346088) - (3100)^2\right]}}$$

$$= \frac{7159300}{97524966}$$

$$= .06$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1{}^2 + \sigma M_2{}^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(50.14) - (62.00)}{\sqrt{98.8968 + 61.5552 - 2(.06)(9.94)(7.84)}}$$

$$= \frac{11.86}{\sqrt{151.1004}}$$

$$= \frac{11.86}{12.30}$$

$$= 0.96$$

$\underline{F_2 - S}$

$$rXY = \frac{\left[N\Sigma XY - (\Sigma X)\ (\Sigma Y)\right]}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

$$= \frac{50(-13173) - (-142)\ (-501)}{\sqrt{\left[50(61924) - (-142)^2\right]\left[50(510011) - (-501)^2\right]}}$$

$$= \frac{139792}{8812974.6}$$

$$= 0.016$$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1{}^2 + \sigma M_2{}^2 - 2r\sigma M_1 \sigma M_2}}$$

$$= \frac{(-2.84) - (-10.02)}{\sqrt{24.6083 + 201.9964 - 2(.016)\ (4.96)\ (14.21)}}$$

$$= \frac{7.18}{\sqrt{224.3493}}$$

$$= \frac{7.18}{14.98}$$

$$= 0.48$$

APPENDIX 3 (d)

Showing computations for t of sex differences on two-cata. response form

B1 - N

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2}}}$$

$$= \frac{(-38.63) - (12.08)}{\sqrt{89.5273 + 91.9503}}$$

$$= \frac{50.71}{\sqrt{181.4776}}$$

$$= \frac{50.71}{13.57}$$

$$= 3.73$$

B2-S

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2}}}$$

$$= \frac{(14.86) - (-0.22)}{\sqrt{(19.6872)+(33.9058)}}$$

$$= \frac{15.08}{\sqrt{53.5930}}$$

$$= \frac{15.08}{7.320}$$

$$= 2.06$$

B_3 - I

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2}}$$

$$= \frac{(-17.56) - (18.80)}{\sqrt{29.6121 + 30.3152}}$$

$$= \frac{36.36}{\sqrt{59.9273}}$$

$$= \frac{36.36}{7.741}$$

$$= 4.697$$

B_4 - D

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2}}$$

$$= \frac{(58.32) - (24.54)}{\sqrt{27.6788 + 34.8098}}$$

$$= \frac{33.78}{\sqrt{62.4886}}$$

$$= \frac{33.78}{7.904}$$

$$= 4.273$$

$\underline{F_1 - C}$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2}}$$

$$= \frac{(-17.22) - (50.14)}{\sqrt{85.4218 + 98.8968}}$$

$$= \frac{67.36}{\sqrt{184.3186}}$$

$$= \frac{67.36}{13.576}$$

$$= 4.961$$

$\underline{F_2 - S}$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2}}$$

$$= \frac{(-2.68) - (-2.84)}{\sqrt{25.6740 + 24.6083}}$$

$$= \frac{0.16}{\sqrt{50.2823}}$$

$$= \frac{0.16}{7.091}$$

$$= .086$$

APPENDIX 3 (e)

Showing computations for t of sex differences on three-cata response form

B1-N

Boys : 50
Girls: 50

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2}}}$$

$$= \frac{(-41.04) - (-11.20)}{\sqrt{85.2460 + 72.1512}}$$

$$= \frac{29.84}{\sqrt{157.3972}}$$

$$= \frac{29.84}{12.59}$$

$$= 2.36$$

B_2 - S

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2}}}$$

$$= \frac{(-1.58) - (-14.22)}{\sqrt{14.3641 + 21.0681}}$$

$$= \frac{12.64}{\sqrt{35.4322}}$$

$$= \frac{12.64}{5.952}$$

$$= 2.12$$

$\underline{B_3 - I}$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2}}}$$

$$= \frac{(-8.60) - (4.02)}{\sqrt{34.7832 + 22.8116}}$$

$$= \frac{12.620}{\sqrt{57.5948}}$$

$$= \frac{12.620}{7.589}$$

$$= 1.06$$

$\underline{B_4 - D}$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^{\,2} + \sigma M_2^{\,2}}}$$

$$= \frac{(25.22) - (-2.48)}{\sqrt{33.9730 + 32.6402}}$$

$$= \frac{27.70}{\sqrt{66.6132}}$$

$$= \frac{27.70}{8.161}$$

$$= 3.394$$

$\underline{F_1 - C}$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2}}$$

$$= \frac{(3.80) - (62.00)}{\sqrt{75.8024 + 61.5552}}$$

$$= \frac{58.20}{\sqrt{137.3576}}$$

$$= \frac{58.20}{11.719}$$

$$= 4.966$$

$\underline{F_2 - S}$

$$t = \frac{M_1 - M_2}{\sqrt{\sigma M_1^2 + \sigma M_2^2}}$$

$$= \frac{(-26.82) - (-10.02)}{\sqrt{134.5470 + 201.9964}}$$

$$= \frac{16.80}{\sqrt{336.5434}}$$

$$= \frac{16.80}{15.379}$$

$$= 1.092$$