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**BMI Trajectories in Adulthood: The Intersection of Skin Color, Gender, and Age among African Americans**

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**Appendix A. Alternative Measurements of Skin Color in the CARDIA Study.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Table 1A.** Growth Curve Models of Skin Color Tertiles, Gender, Sociodemographic Characteristics, Stressors, and Health Behaviors on BMI Trajectories. CARDIA Study, Years 15 to 25. | | | | | | | | | | | | | | | |
| **Model 1 b Model 2c Model 3d Model 4e Model 5f** | | | | | | | | | | | | | | | |
| **Fixed Effects** | Women | Men | a m≠w | Women | Men | m≠w | Women | Men | m≠w | Women | Men | m≠w | Women | Men | m≠w |
| Intercept | 29.248\*\*\*  (.504)\*\*\* | 27.537\*\*\*  (.529)\*\*\* | † | 28.985\*\*\*  (.742)\*\*\* | 26.700\*\*\*  (.684)\*\*\* | † | 29.260\*\*\*  (.509)\*\*\* | 27.505\*\*\*  (.538)\*\*\* | † | 29.678\*\*\*  (.586)\*\*\* | 28.594\*\*\*  (.586)\*\*\* |  | 29.649\*\*\*  (.809)\*\*\* | 28.138\*\*\*  (.754)\*\*\* |  |
| *Skin color (ref. light; SC ≥ 24.2)* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Medium (SC ≥ 18.4 & ≤ 24.1) | .401\*\*\*  (.709)\*\*\* | .886\*\*\*  (.669)\*\*\* |  | .408\*\*\*  (.708)\*\*\* | .781\*\*\*  (.665)\*\*\* |  | .439\*\*\*  (.710)\*\*\* | .899\*\*\*  (.672)\*\*\* |  | .398\*\*\*  (.704)\*\*\* | .888\*\*\*  (.661)\*\*\* |  | .419\*\*\*  (.703)\*\*\* | .798\*\*\*  (.657)\*\*\* |  |
| Dark (SC ≥ 7.1 & ≤ 18.3) | 2.989\*\*\*  (.762)\*\*\* | .776\*\*\*  (.635)\*\*\* | † | 2.952\*\*\*  (.767)\*\*\* | .807\*\*\*  (.632)\*\*\* | † | 3.056\*\*\*  (.763)\*\*\* | .799\*\*\*  (.639)\*\*\* | † | 3.098\*\*\*  (.758)\*\*\* | .920\*\*\*  (.628)\*\*\* | † | 3.090\*\*\*  (.762)\*\*\* | .939\*\*\*  (.626)\*\*\* | † |
| Linear slope (age) | .165\*\*\*  (.024)\*\*\* | .166\*\*\*  (.025)\*\*\* |  | .153\*\*\*  (.043)\*\*\* | .157\*\*\*  (.039)\*\*\* |  | .164\*\*\*  (.025)\*\*\* | .168\*\*\*  (.026)\*\*\* |  | .174\*\*\*  (.031)\*\*\* | .121\*\*\*  (.033)\*\*\* |  | .148\*\*\*  (.047)\*\*\* | .098\*\*\*  (.045)\*\*\* |  |
| *Skin color (ref. light; SC ≥ 24.2)* |  |  |  |  |  |  |  |  |  |  |  |  | \*\*\* |  |  |
| Medium (SC ≥ 18.4 & ≤ 24.1) | .014\*\*\*  (.035)\*\*\* | –.078\*\*\*  (.033)\*\*\* |  | .015\*\*\*  (.035)\*\*\* | –.065\*\*\*  (.033)\*\*\* |  | .010\*\*\*  (.035)\*\*\* | –.079\*\*\*  (.033)\*\*\* |  | .009\*\*\*  (.034)\*\*\* | –.073\*\*\*  (.033)\*\*\* |  | .008\*\*\*  (.034)\*\*\* | –.063\*\*\*  (.033)\*\*\* |  |
| Dark (SC ≥ 7.1 & ≤ 18.3) | –.008\*\*\*  (.038)\*\*\* | –.020\*\*\*  (.031)\*\*\* |  | –.005\*\*\*  (.038)\*\*\* | –.013\*\*\*  (.032)\*\*\* |  | –.013\*\*\*  (.038)\*\*\* | –.021\*\*\*  (.032)\*\*\* |  | –.016\*\*\*  (.037)\*\*\* | –.023\*\*\*  (.031)\*\*\* |  | –.015\*\*\*  (.037)\*\*\* | –.018\*\*\*  (.031)\*\*\* |  |
| **Random Effects** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Level 1 residual | 2.007\*\*\*  (.066)\*\*\* | 1.369\*\*\*  (.052)\*\*\* |  | 2.012\*\*\*  (.067)\*\*\*  .271\*\*\* | 1.357\*\*\*  (.052)\*\*\* |  | 2.005\*\*\*  (.066)\*\*\* | 1.368\*\*\*  (.052)\*\*\* |  | 1.966\*\*\*  (.066)\*\*\* | 1.353\*\*\*  (.052)\*\*\* |  | 1.966\*\*\*  (.066)\*\*\* | 1.345\*\*\*  (.052)\*\*\* |  |
| Level 2 age | .276\*\*\*  (.019)\*\*\* | .178\*\*\*  (.015)\*\*\* |  | .271\*\*\*  (.019)\*\*\* | .177\*\*\*  (.015)\*\*\* |  | .275\*\*\*  (.019)\*\*\* | .178\*\*\*  (.015)\*\*\* |  | .267\*\*\*  (.019)\*\*\* | .176\*\*\*  (.015)\*\*\* |  | .260\*\*\*  (.020)\*\*\* | .172\*\*\*  (.015)\*\*\* |  |
| Level 2 intercept | 7.758\*\*\*  (.253)\*\*\* | 5.383\*\*\*  (.199)\*\*\* |  | 7.705\*\*\*  (.255)\*\*\* | 5.320\*\*\*  (.198)\*\*\* |  | 7.767\*\*\*  (.253)\*\*\* | 5.390\*\*\*  (.200)\*\*\* |  | 7.731\*\*\*  (.252)\*\*\* | 5.279\*\*\*  (.198)\*\*\* |  | 7.687\*\*\*  (.255)\*\*\* | 5.212\*\*\*  (.197)\*\*\* |  |
| –2 log likelihood | 12514 | 7465 |  | 12502 | 7438 |  | 12509 | 7465 |  | 12425 | 7421 |  | 12404 | 7394 |  |
| *N* | 936 | 657 |  | 936 | 657 |  | 936 | 657 |  | 936 | 657 |  | 936 | 657 |  |
| *Note:* BMI = body mass index, SC = skin color (value from spectrometer).  a ‘m≠w’ indicates Chow tests for differences between men and women  b Model 1 estimates effect of skin color on BMI, adjusting for attrition  c Model 2 adds sociodemographic characteristics to Model 1  d Model 3 adds chronic burdens and racial/color discrimination to Model 1  e Model 4 adds health behaviors to Model 1  f Model 5 adjusts for all covariates  \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001  † indicates a statistically significant (*p* < .05) difference in coefficients for men and women | | | | | | | | | | | | | | | |

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| **Table 2A.** Growth Curve Models of Skin Color Quartiles, Gender, Sociodemographic Characteristics, Stressors, and Health Behaviors on BMI Trajectories. CARDIA Study, Years 15 to 25. | | | | | | | | | | | | | | | |
| **Model 1 b Model 2c Model 3d Model 4e Model 5f** | | | | | | | | | | | | | | | |
| **Fixed Effects** | Women | Men | a m≠w | Women | Men | m≠w | Women | Men | m≠w | Women | Men | m≠w | Women | Men | m≠w |
| Intercept | 29.366\*\*\*  (.575)\*\*\* | 27.281\*\*\*  (.619)\*\*\* | † | 29.147\*\*\*  (.788)\*\*\* | 26.495\*\*\*  (.761)\*\*\* | † | 29.395\*\*\*  (.578)\*\*\* | 27.242\*\*\*  (.627)\*\*\* | † | 29.701\*\*\*  (.641)\*\*\* | 28.331\*\*\*  (.674)\*\*\* |  | 29.726\*\*\*  (.845)\*\*\* | 27.977\*\*\*  (.823)\*\*\* |  |
| *Skin color (ref. light; SC ≥ 26.3)* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Light-medium (SC ≥ 21.3 & ≤ 26.2) | –.091\*\*\*  (.801)\*\*\* | .843\*\*\*  (.798)\*\*\* |  | –.103\*\*\*  (.798)\*\*\* | .655\*\*\*  (.794)\*\*\* |  | –.082\*\*\*  (.802)\*\*\* | .871\*\*\*  (.801)\*\*\* |  | .017\*\*\*  (.796)\*\*\* | .845\*\*\*  (.785)\*\*\* |  | –.004\*\*\*  (.793)\*\*\* | .613\*\*\*  (.782)\*\*\* |  |
| Dark-medium (SC ≥ 17 & ≤ 21.2) | .472\*\*\*  (.831)\*\*\* | 1.264\*\*\*  (.771)\*\*\* |  | .401\*\*\*  (.833)\*\*\* | 1.137\*\*\*  (.766)\*\*\* |  | .510\*\*\*  (.833)\*\*\* | 1.284\*\*\*  (.774)\*\*\* |  | .662\*\*\*  (.826)\*\*\* | 1.370\*\*\*  (.760)\*\*\* |  | .597\*\*\*  (.828)\*\*\* | 1.239\*\*\*  (.756)\*\*\* |  |
| Dark (SC ≤ 16.9) | 3.872\*\*\*  (.883)\*\*\* | 1.089\*\*\*  (.733)\*\*\* | † | 3.817\*\*\*  (.883)\*\*\* | 1.107\*\*\*  (.731)\*\*\* | † | 3.914\*\*\*  (.884)\*\*\* | 1.120\*\*\*  (.736)\*\*\* | † | 4.116\*\*\*  (.877)\*\*\* | 1.282\*\*\*  (.722)\*\*\* | † | 4.066\*\*\*  (.878)\*\*\* | 1.246\*\*\*  (.721)\*\*\* | † |
| Linear slope (age) | .169\*\*\*  (.028)\*\*\* | .198\*\*\*  (.030)\*\*\* |  | .157\*\*\*  (.045)\*\*\* | .190\*\*\*  (.043)\*\*\* |  | .166\*\*\*  (.028)\*\*\* | .201\*\*\*  (.030)\*\*\* |  | .185\*\*\*  (.034)\*\*\* | .157\*\*\*  (.036)\*\*\* |  | .158\*\*\*  (.049)\*\*\* | .130\*\*\*  (.049)\*\*\* |  |
| *Skin color (ref. light; SC ≥ 26.3)* |  |  |  |  |  |  |  |  |  |  |  |  |  | \*\*\* |  |
| Light-medium (SC ≥ 21.3 & ≤ 26.2) | .013\*\*\*  (.040)\*\*\* | –.069\*\*\*  (.039)\*\*\* |  | .013\*\*\*  (.040)\*\*\* | –.054\*\*\*  (.039)\*\*\* |  | .013\*\*\*  (.040)\*\*\* | –.070\*\*\*  (.039)\*\*\* |  | .001\*\*\*  (.039)\*\*\* | –.071\*\*\*  (.038)\*\*\* |  | .002\*\*\*  (.039)\*\*\* | –.052\*\*\*  (.039)\*\*\* |  |
| Dark-medium (SC ≥ 17 & ≤ 21.2) | .008\*\*\*  (.041)\*\*\* | –.137\*\*\*  (.038)\*\*\* | † | .011\*\*\*  (.042)\*\*\* | –.123\*\*\*  (.039)\*\*\* | † | .003\*\*\*  (.041)\*\*\* | –.138\*\*\*  (.039)\*\*\* | † | –.011\*\*\*  (.041)\*\*\* | –.142\*\*\*  (.038)\*\*\* | † | –.010\*\*\*  (.041)\*\*\* | –.128\*\*\*  (.038)\*\*\* | † |
| Dark (SC ≤ 16.9) | –.035\*\*\*  (.044)\*\*\* | –.052\*\*\*  (.036)\*\*\* |  | –.031\*\*\*  (.044)\*\*\* | –.044\*\*\*  (.036)\*\*\* |  | –.037\*\*\*  (.044)\*\*\* | –.053\*\*\*  (.036)\*\*\* |  | –.053\*\*\*  (.043)\*\*\* | –.062\*\*\*  (.036)\*\*\* |  | –.047\*\*\*  (.043)\*\*\* | –.052\*\*\*  (.036)\*\*\* |  |
| **Random Effects** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Level 1 residual | 2.009\*\*\*  (.066)\*\*\* | 1.370\*\*\*  (.052)\*\*\* |  | 2.015\*\*\*  (.067)\*\*\* | 1.358\*\*\*  (.052)\*\*\* |  | 2.007\*\*\*  (.066)\*\*\* | 1.369\*\*\*  (.052)\*\*\* |  | 1.968\*\*\*  (.066)\*\*\* | 1.355\*\*\*  (.052)\*\*\* |  | 1.969\*\*\*  (.067)\*\*\* | 1.346\*\*\*  (.052)\*\*\* |  |
| Level 2 age | .276\*\*\*  (.019)\*\*\* | .174\*\*\*  (.016)\*\*\* |  | .270\*\*\*  (.020)\*\*\* | .173\*\*\*  (.015)\*\*\* |  | .274\*\*\*  (.019)\*\*\* | .173\*\*\*  (.016)\*\*\* |  | .266\*\*\*  (.019)\*\*\* | .171\*\*\*  (.015)\*\*\* |  | .259\*\*\*  (.020)\*\*\* | .168\*\*\*  (.016)\*\*\* |  |
| Level 2 intercept | 7.706\*\*\*  (.252)\*\*\* | 5.387\*\*\*  (.199)\*\*\* |  | 7.648\*\*\*  (.255)\*\*\* | 5.322\*\*\*  (.198)\*\*\* |  | 7.716\*\*\*  (.253)\*\*\* | 5.394\*\*\*  (.200)\*\*\* |  | 7.673\*\*\*  (.251)\*\*\* | 5.275\*\*\*  (.198)\*\*\* |  | 7.626\*\*\*  (.255)\*\*\* | 5.209\*\*\*  (.197)\*\*\* |  |
| –2 log likelihood | 12508 | 7458 |  | 12495 | 7431 |  | 12503 | 7457 |  | 12418 | 7412 |  | 12397 | 7386 |  |
| *N* | 935 | 656 |  | 935 | 656 |  | 935 | 656 |  | 935 | 656 |  | 935 | 656 |  |
| *Note:* BMI = body mass index, SC = skin color (value from spectrometer).  a ‘m≠w’ indicates Chow tests for differences between men and women  b Model 1 estimates effect of skin color on BMI, adjusting for attrition  c Model 2 adds sociodemographic characteristics to Model 1  d Model 3 adds chronic burdens and racial/color discrimination to Model 1  e Model 4 adds health behaviors to Model 1  f Model 5 adjusts for all covariates  \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001  † indicates a statistically significant (*p* < .05) difference in coefficients for men and women | | | | | | | | | | | | | | | |

**Appendix B. Alternative Approaches to Imputing Values of Discrimination in Year 20 of the CARDIA Study.**

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| **Table 1B.** Growth Curves Models of Skin Color, Gender, Sociodemographic Characteristics, Stressors, and Health Behaviors on BMI Trajectories—Wave 7 Discrimination Measured as Grand Average of Wave 6 and Wave 8 Values. | | | | | | |
| **Model 1 Model 2b** | | | | | | |
| **Fixed Effects** | Women | Men | a m≠w | Women | Men | m≠w |
| Intercept | 29.459\*\*\* | 24.402\*\*\* | † | 29.661\*\*\* | 27.912\*\*\* |  |
| *Skin color (ref. light)* |  |  |  |  |  |  |
| Medium | .118\*\*\* | .916\*\*\* |  | .180\*\*\* | .821\*\*\* |  |
| Dark | 3.877\*\*\* | .966\*\*\* | † | 3.981\*\*\* | 1.118\*\*\* | † |
| *Stressors* |  |  |  |  |  |  |
| Chronic burdens | –.137\*\*\* | –.059\*\*\* |  | –.138\*\*\* | .024\*\*\* |  |
| Race/color discrimination | .498\*\*\* | .093\*\*\* |  | .605\*\*\* | .127\*\*\* |  |
| Linear slope (age) | .160\*\*\* | .190\*\*\* |  | .157\*\*\* | .120\*\*\* |  |
| *Skin color (ref. light)* |  |  |  |  |  |  |
| Medium | .015\*\*\* | –.096\*\*\* | † | .004\*\*\* | –.084\*\*\* |  |
| Dark | –.032\*\*\* | –.042\*\*\* |  | –.040\*\*\* | –.040\*\*\* |  |
| *Stressors* |  |  |  |  |  |  |
| Chronic burdens | .006\*\*\* | .009\*\*\* |  | .006\*\*\* | .008\*\*\* |  |
| Race/color discrimination | –.055\*\*\* | .004\*\*\* |  | –.062\*\*\* | –.004\*\*\* |  |
| **Random Effects** |  |  |  | \*\*\* |  |  |
| Level 1 residual | 1.991\*\*\* | 1.350\*\*\* |  | 1.950\*\*\* | 1.331\*\*\* |  |
| Level 2 age | .278\*\*\* | .169\*\*\* |  | .265\*\*\* | .165\*\*\* |  |
| Level 2 intercept | 7.760\*\*\* | 5.354\*\*\* |  | 7.672\*\*\* | 5.187\*\*\* |  |
| –2 log likelihood | 12459 | 7412 |  | 12356 | 7346 |  |
| *N* | 935 | 656 |  | 935 | 656 |  |
| *Note:* BMI = body mass index.  a ‘m≠w’ indicates Chow tests for differences between men and women  b Model 2 adjusts for all covariates  \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001  † indicates a statistically significant (p< 0.05) difference in coefficients for men and women | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 2B.** Growth Curves Models of Skin Color, Gender, Sociodemographic Characteristics, Stressors, and Health Behaviors on BMI Trajectories—Wave 7 Discrimination Measured as Skin Color–Gender Specific Means of Wave 6 Values. **Only** | | | | | | |
| **Model 1 Model 2b** | | | | | | |
| **Fixed Effects** | Women | Men | a m≠w | Women | Men | m≠w |
| Intercept | 29.453\*\*\* | 27.433\*\*\* | † | 29.639\*\*\* | 27.928\*\*\* |  |
| *Skin color (ref. light)* |  |  |  |  |  |  |
| Medium | .114\*\*\* | .896\*\*\* |  | .176\*\*\* | .805\*\*\* |  |
| Dark | 3.871\*\*\* | .944\*\*\* | † | 3.972\*\*\* | 1.100\*\*\* | † |
| *Stressors* |  |  |  |  |  |  |
| Chronic burdens | –.128\*\*\* | –.050\*\*\* |  | –.126\*\*\* | .034\*\*\* |  |
| Race/color discrimination | .448\*\*\* | –.002\*\*\* |  | .553\*\*\* | .035\*\*\* |  |
| Linear slope (age) | .160\*\*\* | .188\*\*\* |  | .160\*\*\* | .119\*\*\* |  |
| *Skin color (ref. light)* |  |  |  |  |  |  |
| Medium | .016\*\*\* | –.095\*\*\* | † | .004\*\*\* | –.083\*\*\* |  |
| Dark | –.031\*\*\* | –.041\*\*\* |  | –.040\*\*\* | –.039\*\*\* |  |
| *Stressors* |  |  |  |  |  |  |
| Chronic burdens | .005\*\*\* | .009\*\*\* |  | .004\*\*\* | .007\*\*\* |  |
| Race/color discrimination | –.047t\*\*\* | .006\*\*\* |  | –.052\*\*\* | –.001\*\*\* |  |
| **Random Effects** |  |  |  |  |  |  |
| Level 1 residual | 1.993\*\*\* | 1.350\*\*\* |  | 1.953\*\*\* | 1.331\*\*\* |  |
| Level 2 age | .277\*\*\* | .169\*\*\* |  | .264\*\*\* | .165\*\*\* |  |
| Level 2 intercept | 7.758\*\*\* | 5.350\*\*\* |  | 7.671\*\*\* | 5.182\*\*\* |  |
| –2 log likelihood | 12460 | 7412 |  | 12356 | 7346 |  |
| *N* | 935 | 656 |  | 935 | 656 |  |
| *Note:* BMI = body mass index.  a ‘m≠w’ indicates Chow tests for differences between men and women  b Model 2 adjusts for all covariates  \* *p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001  † indicates a statistically significant (p< 0.05) difference in coefficients for men and women | | | | | | |

**Appendix C. Calculation of Physical Activity Scores.**

|  |  |  |
| --- | --- | --- |
|  | **Intensity Score**  **(mets/minute)** | **Cut points for Frequent Participation (hours/week)** |
| **High Intensity Activities** |  |  |
| Jogging or running | 8 | 2 |
| Vigorous racket sports | 8 | 3 |
| Bicycling | 6 | 2 |
| Swimming | 6 | 2 |
| Vigorous exercise class or vigorous  dancing | 6 | 3 |
| Vigorous job activities (e.g., lifting,  carrying, or digging) | 6 | 5 |
| Home or leisure activities (e.g., snow  shoveling, moving heavy objects, or  weight lifting) | 5 | 3 |
| Strenuous sports (e.g. basketball,  football, skating, or skiing) | 8 | 3 |
| **Moderate/Low Intensity Activities** |  |  |
| Non-strenuous sports (e.g., softball,  shooting baskets, volleyball, ping  pong, or leisurely jogging, swimming,  or biking) | 4 | 3 |
| Taking walks or hiking, or walking to work | 4 | 4 |
| Bowl or golf | 3 | 3 |
| Home exercise or calisthenics | 4 | 3 |
| Home maintenance or gardening (e.g.,  carpentry, painting, raking, or mowing) | 4 | 5 |

*Note:* Intensity values based on information from Jacobs et al. (1989).

**Example:**

Respondent X reported jogging or running (a high intensity activity) for 1 hour/week for 5 months and 4 hours/week for 7 months within the past year. The respondent also reported bowling (a moderate/low intensity activity) for 2 hours/week for 9 months and 5 hours/week for 3 months. For running/jogging and bowling, the intensity of the activity (as measured by the number of kilocalories expended in one minute of activity) is given a value of 8 and 3, respectively, and the cut point for frequent participation in these activities is 2 hours/week and 3 hours/week, respectively. Thus, respondent X jogged/ran *infrequently* for 5 months and *frequently* for 7 months, and also bowled *infrequently* for 9 months and *frequently* for 3 months. To calculate the exercise score for respondent X, the following equations are applied:

8\*[5 + (3\*7)] *{score for jogging/running}* + 3\*[9 + (3\*3)] *{score for bowling}* = 208 + 54 = 262.