Below we present SAS Proc IML code for implementing equations [4] and [5]. The specific example uses the estimated covariance and mean structure from the linear growth Model A, Table 2 and transforms it to Model B, Table 2.

**Proc IML Code**

```sas
proc iml;
reset print;

psiold = { 28.776      12.505,
           12.505       8.201};

muold = { 39.457,
           8.063};

lold = { 1  0,
        1  2,
        1  4};

lnew= { 1  -4,
        1  -2,
        1   0};

psinew  = inv(lnew`*lnew)*lnew`*lold*psiold*lold`*lnew*inv(lnew`*lnew);
munew = inv(lnew`*lnew)*lnew`*lold*muold;

print psinew;
print munew;
run;
```

**Output**

```
PSINEW
   260.032    45.309
   45.309     8.201

MUNEW
     71.709
```
Note: These corresponds to the estimated model from AMOS 4.01 (Model B, Table 2). The small difference in the new mean from the tabled value is due to rounding error. If more significant digits are used in the calculation, the results converge exactly.

The following SAS PROC IML program computes the regression coefficients for Mother's weight predicting the intercept and linear components as well as their standard errors to use in producing Figures 3 and 4.

```sas
filename recode 'c:\outfile.dat';
options nocenter linesize=100;

proc iml;

/* regression weights from AMOS presented in Table 4, Model A*/
gamma5= { 0.045, 0.048, 0.004};

/* asymptotic covariance matrix of the regression coefficients from AMOS*/
acov5 =  { 0.000521690  0.000112382   0.000002876,
                 0.000112382  0.000217347  -0.000018394,
                 0.000002876 -0.000018394   0.000003831};

file recode;

/*/calculating estimates from age 5 to 13 for every .05 years*/
do i = 0 to -8 by -.05;
age = (5 - i);

/*the loading matrix for Model A, Table 4 where age is centered at 5 years*/
l5 =    { 1 0 0,
               1 2 4,
               1 4 16,
               1 6 36,
               1 8 64};
```
/* calculating the transformed loading matrix */
ls = l5;
ls[1, 2] = i;
ls[1, 3] = i * i;
ls[2, 2] = (i + 2);
ls[2, 3] = (i + 2) * (i + 2);
ls[3, 2] = (i + 4);
ls[3, 3] = (i + 4) * (i + 4);
ls[4, 2] = (i + 6);
ls[4, 3] = (i + 6) * (i + 6);
ls[5, 2] = (i + 8);
ls[5, 3] = (i + 8) * (i + 8);

/* obtaining the new gammas from equation 6 */
gam_new = inv(ls` * ls) * ls` * l5 * gamma5;
gam_int = gam_new[1, 1];
gam_lin = gam_new[2, 1];

/* computing the inverse of the transformation (t) matrix */
inv_t = inv(inv(l5` * l5) * l5` * ls);
i2 = [1 0, 0 1];

/* the Jacobian matrix of the Gamma's transformation from equation A24 */
j_gamma = (i2 @ inv_t);`

/* computing the vectors of the Jacobian matrix corresponding to the intercept and linear components*/
j_int = [1, 1, 1];
j_int[1, 1] = j_gamma[1, 1];
j_int[2, 1] = j_gamma[2, 1];
j_int[3, 1] = j_gamma[3, 1];
j_lin = [1, 1, 1];
j_lin[1, 1] = j_gamma[1, 2];
j_lin[2, 1] = j_gamma[2, 2];
j_lin[3, 1] = j_gamma[3, 2];
/* computing the transformed standard errors based on equation A22*/
    se_int = sqrt(j_int'*acov5*j_int);
    se_lin = sqrt(j_lin'*acov5*j_lin);

/*writing out the file with age, intercept gamma, intercept SE, linear
 gamma, and linear SE*/
    put @1 age 5.2 @10 gam_int @20 se_int @30 gam_lin @40 se_lin;
end;
closefile recode;