Appendix

Reynolds, C.A., Barlow, T., Pedersen, N.L. (in press June 22, 2005). Alcohol, tobacco and caffeine use: Spouse similarity processes. *Behavior Genetics.*

```
#define nvar 2
#define maxcat 2
! Multivariate Twin-Family Model with assortative mating
#Ngroups 18
GROUP 1  Males
Calculation
Begin Matrices;
h DI 1 1 fr ! Heritability  1
e DI 1 1 fr ! Nonshared Environmentality 2
s DI 1 1 fr ! S environmentality 3
G ST 1 1 fi ! Rg
U ST 1 1 fi ! Re
O ST 1 1 fi ! Rs
D fu 1 1 fr ! Phenotypic Delta paths 4
Y fu 1 1 fr ! Homogamy Delta paths  5
P st 1 1 fi ! Phenotypic Correlation
c SY 1 1 fr ! additional Twin environment correlated 6
j SY 1 1 fr ! additional Twin environment shared 7
B ST 1 1 fi ! Rc
R ST 1 1 fi ! Rj
k fu 1 1 fi ! .5 for DZ twins
End matrices;
Begin algebra;
End algebra;
CO (h*G*h + s*O*s + c*B*c + j*R*j + e*U*e) /   ! Within person
MA H .7071
MA E .7071
MA S .0025
MA D .25
MA Y .99
MA C .10
MA J .10
ma k .5
BO 0 1 h 1 1 e 1 1 s 1 1 c 1 1 j 1 1
BO 0 1 d 1 1 y 1 1
!intervals h 1 1 e 1 1 s 1 1 c 1 1 j 1 1 d 1 1 y 1 1
End Group;
Group 2 - Constraint on variance Males
Constraint_Group NI=2
Matrices = Group 1;
Constraint P = (h*G*h + s*O*s + c*B*c + j*R*j + e*U*e);
Options RS
```

```
End Group;
GROUP 3  Females
Calculation
Begin Matrices;
h DI 1 1 fr ! Heritability  8
e DI 1 1 fr ! Environmentality 9
s DI 1 1 fr ! S environmentality 10
G ST 1 1 fi ! Rg
U ST 1 1 fi ! Re
O ST 1 1 fi ! Rs
D fu 1 1 =d1 ! Phenotypic Delta paths
Y fu 1 1 =y1 ! Homogamy Delta paths
P st 1 1 fi ! Phenotypic Correlation
c SY 1 1 fr ! additional Twin environment correlated 11
j SY 1 1 fr ! additional Twin environment shared 12
B ST 1 1 fi ! Rc
R ST 1 1 fi ! Rj
k fu 1 1 fi ! .5 for DZ twins
End matrices;
Begin algebra;
End algebra;
CO (h*G*h + s*O*s + c*B*c + j*R*j + e*U*e) /   ! Within person
MA H .7071
MA E .7071
MA S .0025
MA D .25
MA Y .99
MA C .10
MA J .10
ma k .5
BO 0 1 h 1 1 e 1 1 s 1 1 c 1 1 j 1 1
BO 0 1 d 1 1 y 1 1
!intervals h 1 1 e 1 1 s 1 1 c 1 1 j 1 1
End Group;
Group 4 - Constraint on variance Females
Constraint_Group NI=2
Matrices=Group 3;
Constraint P = (h*G*h + s*O*s + c*B*c + j*R*j + e*U*e);
Options rs
End Group;
Group 5 - calc male twin correlations
Calculation
matrices=group 1;  ! get matrices for males in group 1
begin matrices;
a di 1 1 = h(3) ! heritability female
V ST 1 1 = g(3) ! Rg females
```

```
end matrices;
begin algebra;
I = h*G*h + c*B*c + j*R*j + s*O*s;   ! MZT
F = k@h*(G + k@(V*a)*(D'+ D)*(h*G))*h +  c*B*c + j*R*j + s*O*s;  ! DZT
X = h*G*h + c*B*c ;   ! MZA
Z = k@h*(G + k@(V*a)*(D'+ D)*(h*G))*h +  c*B*c ;  ! DZA
end algebra;
End Group;
Group 6 - calc female twin correlations
Calculation
matrices=group 3;  ! get matrices for males in group 1
begin matrices;
a di 1 1 = h(1) ! heritability female
V ST 1 1 = g(1) ! Rg females
end matrices;
begin algebra;
I = h*G*h + c*B*c + j*R*j + s*O*s;   ! MZT
F = k@h*(G + k@(V*a)*(D'+ D)*(h*G))*h +  c*B*c + j*R*j + s*O*s;  ! DZT
X = h*G*h + c*B*c ;   ! MZA
Z = k@h*(G + k@(V*a)*(D'+ D)*(h*G))*h +  c*B*c;  ! DZA
end algebra;
End Group;
!************************************************************
Group 7 Crumpacker MZ MALES together
Data Ninput_vars=51 NObervations=40
ORDINAL File=alcsmkcaf1.raw
Labels allalc agetwn1  agesps1  agetwn2  agesps2
rvsmtwn1 rvsmsps1 rvsmtwn2 rvsmsps2
rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2
galctwn1 galcsps1 galctwn2 galcsps2
falctwn1 falcsps1 falctwn2 falcsps2
scttwn1 sctsps1 scttwn2 sctsps2
rscttwn1 rsctsps1 rscttwn2 rsctsps2
rcigtwn1 rcigsps1 rcigtwn2 rcigsps2
rtobtwn1 rtobsps1 rtobtwn2 rtobsps2
alcsps1  alctwn1  alcsps2  alctwn2
evsmtwn1 evsmsps1 evsmtwn2 evsmsps2
evtbtwn1 evtbsps1 evtbtwn2 evtbsps2
mztwsp1 mztwsp2
Select rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2 agetwn1  agesps1  agetwn2  agesps2  /
Definition_variables agetwn1  agesps1  agetwn2  agesps2  /
Matrices;
A Full Maxcat nvar free        ! thresholds in row 1 and portion added in subsequent rows
C FULL 2 2                     ! centering age (median age in parent generation)
U Lower Maxcat Maxcat          ! so t1<t2<t3
F FULL 2 2  free               ! Age beta
```

```
G FULL 2 2                          ! Observed ages, twin1 & sps 1
K FULL 2 2                          ! Observed ages, twin2 & sps 2
P st 1 1=p(1)  ! Male within person
R st 1 1=p(3)  ! Female within person
S DI 1 1 =s(1) ! S environmentality males
B DI 1 1 =s(3) ! S environmentality females
O ST 1 1 =o(1) ! Rs males
Q ST 1 1 =o(3) ! Rs females
D fu 1 1 =d(1) ! Phenotypic Delta paths
Y fu 1 1 =y(1) ! Homogamy Delta paths
T fu  1 1 =I(5) ! MZ male twins
End Matrices;
Begin Algebra;
M= R*D'*P + b*Q*Y'*O*s;          ! wife (row), husband (col)
N= P*D*R +  s*O*Y*Q*b;                              ! wife (col), husband (row)
X= R*D'*T + b*Q*Y'*O*s;          ! male twin (col), sister in-law (row)
V= T*D*R +  s*O*Y*Q*b;           ! male twin (row), sister in-law (col)
J= R*D'*T*D*R + R*D'*s*O*Y*Q*b + b*Q*Y'*O*s*D*R + b*Q*Y'*O*Y*Q*b;  !sister in-
law, sister in-law
L= P*D*T*D'*P + P*D*b*Q*Y'*O*s + s*O*Y*Q*b*D'*P + s*O*Y*Q*Y'*O*s;  !brother in-
law, brother in-law
end algebra;
Threshold  (U*A + F.(G-C))| (U*A + F.(K-C)) ;
! twin1 spouse1 twin2 spouse2
CO     (P |n |t |v_
       m |R |x |j_
       t |v |P |n _
       x |j |m |R )  /
MA C
56 56
56 56
SP G
agetwn1 agesps1
agetwn1 agesps1
SP K
agetwn2 agesps2
agetwn2 agesps2
SP A
13 14
15 16
MA A
-0.28  0.34  ! theshold 1
0.77  0.32   ! deviations from previous row
Value 1 U 1 1 to U Maxcat Maxcat
Bound 0 5 A 2 1 to A Maxcat Nvar
SP F
```

```
17 19
17 19
MA F
.05 .05
.05 .05
Options RS
End
Group 8 - Crumpacker MZ FEMALES
Data Ninput_vars=51 NObervations=40
ORDINAL File=alcsmkcaf2.raw
Labels allalc agetwn1  agesps1  agetwn2  agesps2
rvsmtwn1 rvsmsps1 rvsmtwn2 rvsmsps2
rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2
galctwn1 galcsps1 galctwn2 galcsps2
falctwn1 falcsps1 falctwn2 falcsps2
scttwn1 sctsps1 scttwn2 sctsps2
rscttwn1 rsctsps1 rscttwn2 rsctsps2
rcigtwn1 rcigsps1 rcigtwn2 rcigsps2
rtobtwn1 rtobsps1 rtobtwn2 rtobsps2
alcsps1  alctwn1  alcsps2  alctwn2
evsmtwn1 evsmsps1 evsmtwn2 evsmsps2
evtbtwn1 evtbsps1 evtbtwn2 evtbsps2
mztwsp1 mztwsp2
Select rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2 agetwn1  agesps1  agetwn2  agesps2  /
Definition_variables agetwn1  agesps1  agetwn2  agesps2  /
Matrices;
A Full Maxcat nvar     free      ! thresholds in row 1 and portion added in subsequent rows
C FULL 2 2                       ! centering age (median age in parent generation)
U Lower Maxcat Maxcat            ! so t1<t2<t3
F FULL 2 2   free                ! Age beta
G FULL 2 2                       ! Observed ages, twin1 & sps 1
K FULL 2 2                       ! Observed ages, twin2 & sps 2
P st 1 1=p(1)  ! Male within person
R st 1 1=p(3)  ! Female within person
S DI 1 1 =s(1) ! S environmentality males
B DI 1 1 =s(3) ! S environmentality females
O ST 1 1 =o(1) ! Rs males
Q ST 1 1 =o(3) ! Rs females
D fu 1 1 =d(1) ! Phenotypic Delta paths
Y fu 1 1 =y(1) ! Homogamy Delta paths
T fu 1 1 =I(6) ! MZ female twins
End Matrices;
Begin Algebra;
M= R*D'*P + b*Q*Y'*O*s;          ! wife (row), husband (col)
N= P*D*R + s*O*Y*Q*b;                              ! wife (col), husband (row)
X= P*D*T + s*O*Y*Q*b;            ! male sps (row), twin sister in-law (col)
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```
V= T*D'*P + b*Q*Y'*O*s ;            ! male sps (col), twin sister in-law (row)
J= R*D'*T*D*R + R*D'*s*O*Y*Q*b + b*Q*Y'*O*s*D*R + b*Q*Y'*O*Y*Q*b;  !sister in-
law, sister in-law
L= P*D*T*D'*P + P*D*b*Q*Y'*O*s + s*O*Y*Q*b*D'*P + s*O*Y*Q*Y'*O*s;  !brother in-
law, brother in-law
end algebra;
Threshold  (U*A + F.(G-C))| (U*A + F.(K-C)) ;
CO   (R |m |t |v_
      n |P |x |l_
      t |v |R |m_
      x |l |n |P )   /
MA C
56 56
56 56
SP G
agetwn1 agesps1
agetwn1 agesps1
SP K
agetwn2 agesps2
agetwn2 agesps2
SP A
14 13
16 15
MA A
0.28  -0.34  ! theshold 1
0.77  0.32   ! deviations from previous row
Value 1 U 1 1 to U Maxcat Maxcat
Bound 0 5 A 2 1 to A Maxcat Nvar
SP F
19 17
19 17
MA F
.05 .05
.05 .05
Options RS
End
Group 9 Crumpacker DZ MALES
Data Ninput_vars=52 NObervations=40
ORDINAL File=alcsmkcaf3.raw
Labels allalc agetwn1  agesps1  agetwn2  agesps2
rvsmtwn1 rvsmsps1 rvsmtwn2 rvsmsps2
rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2
galctwn1 galcsps1 galctwn2 galcsps2
falctwn1 falcsps1 falctwn2 falcsps2
scttwn1 sctsps1 scttwn2 sctsps2
rscttwn1 rsctsps1 rscttwn2 rsctsps2
```

```
rcigtwn1 rcigsps1 rcigtwn2 rcigsps2
rtobtwn1 rtobsps1 rtobtwn2 rtobsps2
alcsps1  alctwn1  alcsps2  alctwn2
evsmtwn1 evsmsps1 evsmtwn2 evsmsps2
evtbtwn1 evtbsps1 evtbtwn2 evtbsps2
dztwsp1 dztwsp2 dztwin
Select rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2 agetwn1  agesps1  agetwn2  agesps2  /
Definition_variables agetwn1  agesps1  agetwn2  agesps2  /
Matrices;
A Full Maxcat nvar =a7 ! thresholds in row 1 and portion added in subsequent rows
C FULL 2 2=c7                    ! centering age (median age in parent generation)
U Lower Maxcat Maxcat =u7 ! so t1<t2<t3
F FULL 2 2  =f7                   ! Age beta
G FULL 2 2      ! Observed ages, twin1 & sps 1
K FULL 2 2       ! Observed ages, twin2 & sps 2
P st 1 1=p(1)  ! Male within person
R st 1 1=p(3)  ! Female within person
S DI 1 1 =s(1) ! S environmentality males
B DI 1 1 =s(3) ! S environmentality females
O ST 1 1 =o(1) ! Rs males
Q ST 1 1 =o(3) ! Rs females
D fu 1 1 =d(1) ! Phenotypic Delta paths
Y fu 1 1 =y(1) ! Homogamy Delta paths
T fu 1 1 =F(5) ! DZ male twins
End Matrices;
Begin Algebra;
M= R*D'*P + b*Q*Y'*O*s;            ! wife (row), husband (col)
N= P*D*R +  s*O*Y*Q*b;                                  ! wife (col), husband (row)
X= R*D'*T + b*Q*Y'*O*s;            ! male twin (col), sister in-law (row)
V= T*D*R +  s*O*Y*Q*b;             ! male twin (row), sister in-law (col)
J= R*D'*T*D*R + R*D'*s*O*Y*Q*b + b*Q*Y'*O*s*D*R + b*Q*Y'*O*Y*Q*b;  !sister in-
law, sister in-law
L= P*D*T*D'*P + P*D*b*Q*Y'*O*s + s*O*Y*Q*b*D'*P + s*O*Y*Q*Y'*O*s;  !brother in-
law, brother in-law
end algebra;
Threshold  (U*A + F.(G-C))| (U*A + F.(K-C)) ;
! twin1 spouse1 twin2 spouse2
CO   (P |n |t |v_
      m |R |x |j_
      t |v |P |n _
      x |j |m |R )  /
SP G
agetwn1 agesps1
agetwn1 agesps1
SP K
agetwn2 agesps2
```

```
agetwn2 agesps2
Options RS
End
Group 10 Crumpacker DZ FEMALES
Data Ninput_vars=52 NObervations=40
ORDINAL File=alcsmkcaf4.raw
Labels allalc agetwn1  agesps1  agetwn2  agesps2
rvsmtwn1 rvsmsps1 rvsmtwn2 rvsmsps2
rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2
galctwn1 galcsps1 galctwn2 galcsps2
falctwn1 falcsps1 falctwn2 falcsps2
scttwn1 sctsps1 scttwn2 sctsps2
rscttwn1 rsctsps1 rscttwn2 rsctsps2
rcigtwn1 rcigsps1 rcigtwn2 rcigsps2
rtobtwn1 rtobsps1 rtobtwn2 rtobsps2
alcsps1  alctwn1  alcsps2  alctwn2
evsmtwn1 evsmsps1 evsmtwn2 evsmsps2
evtbtwn1 evtbsps1 evtbtwn2 evtbsps2
dztwsp1 dztwsp2 dztwin
Select rvtbtwn1 rvtbsps1 rvtbtwn2 rvtbsps2 agetwn1  agesps1  agetwn2  agesps2  /
Definition_variables agetwn1  agesps1  agetwn2  agesps2  /
Matrices;
A Full Maxcat nvar =a8 ! thresholds in row 1 and portion added in subsequent rows
C FULL 2 2=c8                    ! centering age (median age in parent generation)
U Lower Maxcat Maxcat =u8 ! so t1<t2<t3
F FULL 2 2  =f8                   ! Age beta
G FULL 2 2      ! Observed ages, twin1 & sps 1
K FULL 2 2       ! Observed ages, twin2 & sps 2
P st 1 1=p(1)  ! Male within person
R st 1 1=p(3)  ! Female within person
S DI 1 1 =s(1) ! S environmentality males
B DI 1 1 =s(3) ! S environmentality females
O ST 1 1 =o(1) ! Rs males
Q ST 1 1 =o(3) ! Rs females
D fu 1 1 =d(1) ! Phenotypic Delta paths
Y fu 1 1 =y(1) ! Homogamy Delta paths
T fu 1 1 =F(6) ! DZ female twins
End Matrices;
Begin Algebra;
M= R*D'*P + b*Q*Y'*O*s;           ! wife (row), husband (col)
N= P*D*R + s*O*Y*Q*b;                                ! wife (col), husband (row)
X= P*D*T + s*O*Y*Q*b;             ! male sps (row), twin sister in-law (col)
V= T*D'*P + b*Q*Y'*O*s ;          ! male sps (col), twin sister in-law (row)
J= R*D'*T*D*R + R*D'*s*O*Y*Q*b + b*Q*Y'*O*s*D*R + b*Q*Y'*O*Y*Q*b;  !sister in-
law, sister in-law
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```
L= P*D*T*D'*P + P*D*b*Q*Y'*O*s + s*O*Y*Q*b*D'*P + s*O*Y*Q*Y'*O*s;  !brother in-law, brother in-law
end algebra;
Threshold  (U*A + F.(G-C))| (U*A + F.(K-C)) ;
CO   (R |m |t |v_
      n |P |x |l_
      t |v |R |m_
      x |l |n |P )  /
SP G
agetwn1 agesps1
agetwn1 agesps1
SP K
agetwn2 agesps2
agetwn2 agesps2
Options RS
End
Group 11 - SATSA MZA males
Data Ninput_vars=25 NObervations=300
Ordinal File=alcsmokMMZA2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 1;
A fu Maxcat nvar free
Q lo Maxcat Maxcat
L fu 1 1 fr
z fu 2 2
W fu 2 2
T fu 1 1=x(5)
end matrices;
Threshold  (Q*A + L@(Z-W)) ;
CO  (P |t_
      t |P )   /
SP Z
ageyrs ageyrs
ageyrs ageyrs
MA W
56 56
```

```
56 56
SP L
17
SP A
13 13
15 15
Bound 0 5 A 2 1 to A Maxcat Nvar
Value 1 Q 1 1 to Q Maxcat Maxcat
Options RS
End
Group 12 - SATSA MZT males
Data NInput_vars=25 NObservations=300
Ordinal File=alcsmokMMZT2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 1;
A fu Maxcat nvar =A11
Q lo Maxcat Maxcat
L fu 1 1 =L11
z fu 2 2
W fu 2 2 =Z11
T fu 1 1=I(5)
end matrices;
Threshold  (Q*A + L@(Z-W))  /
CO (P |t_
      t |P )   /
SP Z
ageyrs ageyrs
ageyrs ageyrs
Value 1 Q 1 1 to Q Maxcat Maxcat
Options RS
End
Group 13 - SATSA DZA males
Data NInput_vars=25 NObservations=300
Ordinal File=alcsmokMDZA2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
```

```
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 1;
A fu Maxcat nvar =A11
Q lo Maxcat Maxcat
L fu 1 1 =L11
z fu 2 2
W fu 2 2 =Z11
T fu 1 1 =z(5)
end matrices;
Threshold  (Q*A + L@(Z-W)) ;
co   (P|t_
       t |P )   /
SP Z
ageyrs ageyrs
ageyrs ageyrs
Value 1 Q 1 1 to Q Maxcat Maxcat
Options RS
End
Group 14 - SATSA DZT males
Data NInput_vars=25 NObservations=300
Ordinal File=alcsmokMDZT2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 1;
A fu Maxcat nvar =A11
Q lo Maxcat Maxcat
L fu 1 1 =L11
z fu 2 2
W fu 2 2=Z11
```

```
T fu 1 1=F(5)
end matrices;
Threshold  (Q*A + L@(Z-W)) ;
CO   (P |t_
      t |P )   /
SP z
ageyrs ageyrs
ageyrs ageyrs
Value 1 Q 1 1 to Q Maxcat Maxcat
Options RS
End
Group 15 - SATSA MZA females
Data NInput_vars=25 NObservations=300
Ordinal File=alcsmokFMZA2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 3;
A fu Maxcat nvar fr
Q lo Maxcat Maxcat
L fu 1 1 fr
z fu 2 2
W fu 2 2
T fu 1 1=x(6)
end matrices;
Threshold  (Q*A + L@(Z-W)) ;
CO  (P |t_
      t |P )   /
SP Z
ageyrs ageyrs
ageyrs ageyrs
MA W
56 56
56 56
SP L
19
SP A
14 14
```

```
16 16
Value 1 Q 1 1 to Q Maxcat Maxcat
Bound 0 5 A 2 1 to A Maxcat Nvar
Options RS
End
Group 16 - SATSA MZT females
Data NInput_vars=25 NObservations=300
Ordinal File=alcsmokFMZT2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 3;
A fu Maxcat nvar =A15
Q lo Maxcat Maxcat
L fu 1 1 =L15
z fu 2 2
W fu 2 2=Z15
T fu 1 1=I(6)
end matrices;
Threshold  (Q*A + L@(Z-W)) ;
CO   (P |t_
      t |P )   /
SP Z
ageyrs ageyrs
ageyrs ageyrs
Value 1 Q 1 1 to Q Maxcat Maxcat
Options RS
End
Group 17 - SATSA DZA females
Data NInput_vars=25 NObservations=300
Ordinal File=alcsmokFDZA2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
```

```
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 3;
A fu Maxcat nvar =A15
Q lo Maxcat Maxcat
L fu 1 1 =L15
z fu 2 2
W fu 2 2=Z15
T fu 1 1=z(6)
end matrices;
Threshold  (Q*A + L@(Z-W)) ;
CO   (P |t_
      t |P )   /
SP Z
ageyrs ageyrs
ageyrs ageyrs
Value 1 Q 1 1 to Q Maxcat Maxcat
Options RS
End
Group 18 - SATSA DZT females
Data NInput_vars=25 NObservations=300
Ordinal File=alcsmokFDZT2.raw
Labels ageband ageyrs married livenow tlivenow
smoksta tsmoksta tobacst ttobacst rgmcig trgmcig rgmtob trgmtob
evsmoke tevsmoke evtobac tevtobac
rgmalc trgmalc rfrqalc trfrqalc rrsumcft trsumcft alcohol talcohol
select if ageyrs > 37 /
!select if ageyrs < 74 /
!select if livenow ^= 4 /
!select if tlivenow ^= 4 /
select if married ^= 0 /
Select tobacst ttobacst ageyrs /
Definition_variables ageyrs  /
Matrices=Group 3;
A fu Maxcat nvar =A15
Q lo Maxcat Maxcat
L fu 1 1 =L15
z fu 2 2
W fu 2 2=Z15
T fu 1 1=F(6)
end matrices;
Threshold  (Q*A + L@(Z-W)) ;
CO   (P |t_
      t |P )   /
```

```
SP Z
ageyrs ageyrs
ageyrs ageyrs
Value 1 Q 1 1 to Q Maxcat Maxcat
Options RS MU ISSAT df=-2
End
save full.mxs
!Equate m=f
get full.mxs
eq h 1 1 1 h 3 1 1
eq e 1 1 1 e 3 1 1
eq s 1 1 1 s 3 1 1
eq c 1 1 1 c 3 1 1
eq j 1 1 1 j 3 1 1
Options Mu
end
!Equate m=f
get full.mxs
eq h 1 1 1 h 3 1 1
eq e 1 1 1 e 3 1 1
eq s 1 1 1 s 3 1 1
eq c 1 1 1 c 3 1 1
eq j 1 1 1 j 3 1 1
Options Mu ISSAT
end
save fulleq.mxs
! Drop Y & D (NO ASSORTMENT)
get fulleq.mxs
DR 3 10 4 5
Options Mu
end
! Drop D (NO PHENOTYPIC ASSORTMENT)
get fulleq.mxs
DR 4
Options Mu
end
! Drop Y, s, O (NO SOCIAL HOMOGAMY)
get fulleq.mxs
DR 3 5 10
Options Mu
end
! Drop h, Rg (NO HERITABILITY)
get fulleq.mxs
DR 1 8
Options Mu
end
```

```
! Drop C (NO CORRELATED ENV)
get fulleq.mxs
DR 6 11
Options Mu
end
! Drop J (NO Shared Twin Env)
get fulleq.mxs
DR 7 12
Options Mu
end
! Drop C & J
get fulleq.mxs
DR 6 11 7 12
Options Mu
end
! Drop D & C & J
get fulleq.mxs
DR 4 6 11 7 12
Options Mu
end
```