

The following base program (in Stata) for these simulations is based on that of Dunn and Bentall.<sup>14</sup>

```
clear
  prog drop _all
  capture program drop a_IV_2SLS
  program a_IV_2SLS, rclass

  local num=1000
  set obs `num'
  gen interven=1
  replace interven=0 if _n > `num'/2
  gen x1=100+10*invnorm(uniform()) //x1=baseline covariate
  gen x2=10+3*invnorm(uniform()) //x2=baseline covariate
  gen e1=10*invnorm(uniform()) //e1=the selection
  //effect/unmeasured //confounder;
  gen A1=3+invnorm(uniform()+0.05*e1 //A1=the latent effect modifier
alliance
  gen A2=A1+invnorm(uniform()) //A2=the measured level of the
effect //modifier alliance

  replace A2=. if interven==0
  gen x3=A1+invnorm(uniform()) //x3=baseline covariate;
  //the imperfect prediction
  //term=+invnorm(uniform())
  gen y0=x1+e1 //y0=control response
  gen e2=0.1*invnorm(uniform()) //e2=an error term
  gen c=0.6+((x2-10)/10)+0.01*e1+e2 //c=latent compliance to therapy
  replace c=0 if c<0
  replace c=1 if c>1
  gen e6=2*invnorm(uniform()) //e6=an error term
  gen y=y0+0.5*c*(1-6*A1)+e6 //y=treatment response

  gen outcome=y*interven+ y0*(1-interven) //final outcome
  gen s=c
  replace s=0 if interven==0
  gen sA2=s*A2
  replace sA2=0 if interven==0

  //The IV(2SLS) procedure
  generate x1g=x1*interven
  generate x2g=x2*interven
  generate x3g=x3*interven
  ivreg outcome x1 x2 x3 (s sa2 = interven x1g x2g x3g)

end
```