WinBUGS code for all models

Model 1a: Intervention effects

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Cannabis use

```
#Intervention categories#
#1=TAU#
#2=TAU+#
#3=any risk behaviour intervention#


# Normal likelihood, identity link, trial-level data given as treatment differences
# Fixed effect model for two-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns2) { # LOOP THROUGH 2-ARM STUDIES
 y[i,2] ~ dnorm(delta[i,2],prec[i,2]) # normal likelihood for 2-arm trials
var[i,2] <- pow(se[i,2],2) # calculate variances
prec[i,2] <- 1/var[i,2] # set precisions
dev[i,2] <- (y[i,2]-delta[i,2])*(y[i,2]-delta[i,2])*prec[i,2] #Deviance contribution
delta[i,2] <- d[t[i,2]] - d[t[i,1]]
}
totresdev <- sum(dev[,2]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
} # *** PROGRAM ENDS


#Data
list(ns2=4, nt=3)
t[,1]    t[,2]    y[,2]    y[,3]    se[,2]    #Author
2        3        0.19     NA       0.13                #Baker 2015
2        3        0.08     NA       0.268               #Bechdolf 2013
1        3        0        NA       0.112               #Gaughran 2017
2        3        0.27     NA       0.245               #Horthoj 2016
END

# Initial Values
#chain 1
list(d=c( NA, 0,0)
#chain 2
list(d=c( NA, -1,-1)
```

Alcohol use

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```
#Intervention categories#
#1=TAU#
#2=TAU+#
#3=any risk behaviour intervention#

# Normal likelihood, identity link, trial-level data given as treatment differences
# Random effects model for two-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns2) { # LOOP THROUGH 2-ARM STUDIES
 y[i,2] ~ dnorm(delta[i,2],prec[i,2]) # normal likelihood for 2-arm trials
 var[i,2] <- pow(se[i,2],2) # calculate variances
 prec[i,2] <- 1/var[i,2] # set precisions
 dev[i,2] <- (y[i,2]-delta[i,2])*(y[i,2]-delta[i,2])*prec[i,2] #Deviance contribution
 delta[i,2] ~ dnorm(md[i,2],tau) # trial-specific treat effects distributions
 md[i,2] <- d[t[i,2]] - d[t[i,1]] # mean of treat effects distributions
 }
totresdev <- sum(dev[,2]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

#Data
list(ns2=5, nt=3)
t[,1]   t[,2]   y[,2]   y[,3]   se[,2]  #Author
1       3       0.32    NA      0.158   #Gaughran 2017
1       3       -0.3    NA      0.219   #Hjorth 2016
1       3       0.45    NA      0.357   #Jones 2019
2       3       0.104   NA      0.131   #Baker 2015
2       3       -0.06   NA      0.268   #Bechdolf 2012
END

#Inits
#chain 1
list(d=c( NA, 0,0), sd=1)

#chain 1
list(d=c( NA, 0.5, 1), sd=2)
```

Total physical activity

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```
#Intervention categories#
#1=TAU#
#2=TAU+#
#3=any risk behaviour intervention#

# Normal likelihood, identity link, trial-level data given as treatment differences
# Random effects model for two-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns2) { # LOOP THROUGH 2-ARM STUDIES
 y[i,2] ~ dnorm(delta[i,2],prec[i,2]) # normal likelihood for 2-arm trials
 var[i,2] <- pow(se[i,2],2) # calculate variances
 prec[i,2] <- 1/var[i,2] # set precisions
 dev[i,2] <- (y[i,2]-delta[i,2])*(y[i,2]-delta[i,2])*prec[i,2] #Deviance contribution
 delta[i,2] ~ dnorm(md[i,2],tau) # trial-specific treat effects distributions
 md[i,2] <- d[t[i,2]] - d[t[i,1]] # mean of treat effects distributions
 }
totresdev <- sum(dev[,2]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

#Data
list(ns2=7, nt=3)
t[,1]	t[,2]	y[,2]	y[,3]	se[,2]	#Author
1	3	0.01	NA	0.179	#Attux 2013
1	3	0.23	NA	0.11	#Holt 2019
1	3	0.01	NA	0.11	#Masa-Font 2015
2	3	0.53	NA	0.27	#McKibbin 2016
1	3	0.97	NA	0.429	#Sylvia 2019
1	3	-0.35	NA	0.245	#Gaughran 2017
1	3	0.13	NA	0.36	#Williams 2019
END

#Inits
#chain 1
list(d=c( NA, 0,0), sd=1)

#chain 1
list(d=c( NA, 0.5, 1), sd=2)
```

Weight at endpoint

#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Normal likelihood, identity link
# Random effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 w[i,1] <- 0 # adjustment for multi-arm trials is zero for control arm
 delta[i,1] <- 0 # treatment effect is zero for control arm
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + delta[i,k] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 for (k in 2:na[i]) { # LOOP THROUGH ARMS
 delta[i,k] ~ dnorm(md[i,k],taud[i,k]) # trial-specific LOR distributions
 md[i,k] <- d[t[i,k]] - d[t[i,1]] + sw[i,k] # mean of treat effects distributions (with multi-arm trial correction)
 taud[i,k] <- tau *2*(k-1)/k # precision of treat effects distributions (with multi-arm trial correction)
 w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]]) # adjustment for multi-arm RCTs
 sw[i,k] <- sum(w[i,1:k-1])/(k-1) # cumulative adjustment for multi-arm trials
 }
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD.
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

#Data
list(ns=30, nt=6)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
1	4	NA	78.14	73.89	NA	3.733523805	3.956009353	NA	2	#Battaglia (2013)
1	3	NA	81.55	82.99	NA	4.893178926	6.236011546	NA	2	#Scocco (2006)
1	5	3	82.4	79.5	77.9	1.498031495	1.441599443	1.991361943	3	#Sugawara (2018)
1	4	NA	81.5	82.8	NA	2.245365598	1.75	NA	2	#Marzolini (2009)
1	5	NA	0.83	-0.27	NA	0.540936688	0.698267946	NA	2	#Methapatara (2011)
2	5	NA	99.5	98.73	NA	3.147535982	4.01965217	NA	2	#McKibbin (2006
1	5	NA	33.9	33	NA	1.145512986	0.84016805	NA	2	#Usher (2013)
1	5	NA	-0.62	-2.45	NA	0.169705627	0.37123106	NA	2	#Weber (2006)
```

```
2	5	NA	67.2	63.4	NA	0.459619408	0.459619408	NA	2	#Wu (2008)
1	5	NA	0.2	-3.6	NA	0.683536555	0.671317113	NA	2	#Mauri (2008)
1	5	5	0.68	-1.23	-1.16	0.940452019	0.67	0.78	3	#Ratliff (2012)
1	5	NA	84.7	80.7	NA	2.203337689	1.820302173	NA	2	#Attux 2013
1	5	NA	-1.1	-2	NA	0.511280851	0.649979638	NA	2	#Brar (2005)
1	5	NA	79	81.9	NA	3.535533906	4.187986482	NA	2	#Cordes 2011
1	5	NA	-0.2	-3.4	NA	0.765443091	0.663689712	NA	2	#Daumit 2013
1	5	NA	6	2	NA	0.783929496	0.750651891	NA	2	#Evans 2005
2	5	NA	90	96	NA	7.40524762	5.259051155	NA	2	#Forsberg 2008
1	5	NA	85	83.2	NA	2.933263967	2.806421894	NA	2	#Gilhoff 2010
1	5	NA	95.3	92.3	NA	8.579793537	3.250494468	NA	2	#Iglesias-Garcia 2010
2	5	NA	83.5	88	NA	3.586447922	2.98	NA	2	#Khazaal 2007
2	5	NA	-1.48	-3.94	NA	0.502451135	0.674074078	NA	2	#Kwon 2006
1	5	NA	85.36	81.66	NA	3.284269434	2.586172019	NA	2	#Littrell 2003
1	5	NA	101.3	104.1	NA	1.801877633	1.632767021	NA	2	#Holt 2019
2	6	NA	-0.1	0.6	NA	0.66	0.23	NA	2	#Baker 2015
1	6	NA	93.29	94.55	NA	3.229737347	4.269108723	NA	2	#Fernandez Guijarro 2019
1	5	NA	102.73	90.5	NA	7.479572737	4.615105633	NA	2	#Sylvia 2019
1	4	NA	100.13	93.38	NA	3.49	3.04	NA	2	#Romain 2019
2	3	NA	86.92	87.17	NA	2.388975291	2.70168522	NA	2	#Soric 2019
1	5	NA	109.09	102.59	NA	3.780445594	3.023781274	NA	2	#Brown 2011
1	6	2	102.9	103.1	103.7	1.925563625	2.172632811	1.990058626	3	#Speyer 2016
END

list(d=c(NA, 0,0,0,0,0), sd=1, mu=c(0,0,0,0,0,	0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0 ,  0,0,0,0,0)

list(d=c(NA, -1,-1,-1,-1,-1), sd=1, mu=c(0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,
	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5)
```

BMI at endpoint

#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Normal likelihood, identity link
# Random effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 w[i,1] <- 0 # adjustment for multi-arm trials is zero for control arm
 delta[i,1] <- 0 # treatment effect is zero for control arm
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + delta[i,k] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 for (k in 2:na[i]) { # LOOP THROUGH ARMS
 delta[i,k] ~ dnorm(md[i,k],taud[i,k]) # trial-specific LOR distributions
 md[i,k] <- d[t[i,k]] - d[t[i,1]] + sw[i,k] # mean of treat effects distributions (with multi-arm trial correction)
 taud[i,k] <- tau *2*(k-1)/k # precision of treat effects distributions (with multi-arm trial correction)
 w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]]) # adjustment for multi-arm RCTs
 sw[i,k] <- sum(w[i,1:k-1])/(k-1) # cumulative adjustment for multi-arm trials
 }
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD.
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS
```

#Data
list(ns=36, nt=6)

t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
1	4	NA	29.17	27.22	NA	0.947523087	1.170042734	NA	2	#Battaglia (2013)
2	4	NA	27.2	26.6	NA	1.24	1.077032961	NA	2	#Scheewe (2013)
1	3	NA	27.47	30.64	NA	1.248043469	2.507686185	NA	2	#Scocco (2006)
1	5	3	30.4	29.7	29.2	0.550558584	0.5497625	0.610847222	3	#Sugawara (2018)
1	4	NA	32	32.13	NA	2.757716447	1.368251622	NA	2	#Lee (2014)
1	4	NA	81.5	82.8	NA	2.245365598	1.75	NA	2	#Marzolini (2009)
1	5	NA	0.26	-0.12	NA	0.196222132	0.240416306	NA	2	#Methapatara (2011)

```
1	5	NA	33.9	32.9	NA	1.225589232	1.247282761	NA	2	#McKibbin (2006
1	6	2	34.4	33.9	34.5	0.559034601	0.538593848	0.575108685	3	#Speyer (2016)
1	5	NA	33.9	33	NA	1.145512986	0.84016805	NA	2	#Usher (2013)
1	5	NA	-0.24	1.22	NA	0.431335137	0.37123106	NA	2	#Weber (2006)
1	5	5	35.6	34.1	35.9	0.399751343	0.42961496	0.418933925	3	#Young 2017
2	5	NA	25.4	23.1	NA	0.153795725	0.153795725	NA	2	#Wu (2008)
1	5	NA	0	-1.3	NA	0.259272486	0.232379001	NA	2	#Mauri (2008)
2	5	NA	30.4	31.3	NA	0.610658027	0.77482717	NA	2	#Melamed (2008)
1	5	NA	29.1	29.9	NA	0.640075753	0.606767391	NA	2	#Attux 2013
1	6	NA	26.7	28.4	NA	0.848528137	0.748845265	NA	2	#Cordes 2011
1	5	NA	-0.1	-1.2	NA	0.255442325	0.229174624	NA	2	#Daumit 2013
1	4	NA	24.8	23.1	NA	0.542217668	0.35	NA	2	#Kalsatou 2015
1	5	NA	2	0.7	NA	0.27136021	0.250217297	NA	2	#Evans 2005
2	5	NA	29.3	31.1	NA	1.664100589	1.614812388	NA	2	#Forsberg 2008
1	5	NA	28.7	28.1	NA	0.840991478	0.790348025	NA	2	#Gilhoff 2010
1	5	NA	33.7	32	NA	2.418972627	1.511857892	NA	2	#Iglesias-Garcia 2010
2	5	NA	28.5	31	NA	1.000869187	1.08	NA	2	#Khazaal 2007

2	5	NA	-0.59	-1.5	NA	0.195100707	0.248831753	NA	2	#Kwon 2006
1	5	NA	28.18	26.39	NA	0.943192148	0.650768776	NA	2	#Littrell 2003
1	6	NA	-0.01	-0.2	NA	0.431113458	0.280652142	NA	2	#Hjorth 2014
1	5	NA	34.8	35.6	NA	0.555008723	0.557152727	NA	2	#Holt 2019
2	6	NA	0	0.4	NA	0.213637709	0.251960981	NA	2	#Baker 2015
1	4	NA	33.19	32.05	NA	1.039402301	0.910062173	NA	2	#Romain 2019
2	3	NA	26.96	28.16	NA	0.677419411	0.877351386	NA	2	#Soric 2019
1	6	NA	33.19	31.61	NA	0.963991701	1.135783241	NA	2	#Fernandez Gujjiro 2019
1	5	NA	36.1	32.6	NA	2.107328483	1.137135402	NA	2	#Sylvia 2019
1	6	NA	32	32	NA	0.59805036	0.567774974	NA	2	#Osborn 2018
1	3	NA	32.34	32.38	NA	0.426093685	0.476153846	NA	2	#Masa-Font 2015
1	3	NA	-0.5	-0.9	NA	0.195634795	0.236668047	NA	2	#Brar 2005
END

list(d=c(NA, 0,0,0,0,0), sd=1, mu=c(0,0,0,0,0,	0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0, 0,0,0,0,0,	0)

list(d=c(NA, -1,-1,-1,-1,-1), sd=1, mu=c(0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,
	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5, 0.5,	0.5,0.5,0.5,0.5,0.5,	0.5)
```

Systolic blood pressure

#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Normal likelihood, identity link
# Random effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 w[i,1] <- 0 # adjustment for multi-arm trials is zero for control arm
 delta[i,1] <- 0 # treatment effect is zero for control arm
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + delta[i,k] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 for (k in 2:na[i]) { # LOOP THROUGH ARMS
 delta[i,k] ~ dnorm(md[i,k],taud[i,k]) # trial-specific LOR distributions
 md[i,k] <- d[t[i,k]] - d[t[i,1]] + sw[i,k] # mean of treat effects distributions (with multi-arm trial correction)
 taud[i,k] <- tau *2*(k-1)/k # precision of treat effects distributions (with multi-arm trial correction)
 w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]]) # adjustment for multi-arm RCTs
 sw[i,k] <- sum(w[i,1:k-1])/(k-1) # cumulative adjustment for multi-arm trials
 }
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD.
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

#Data
list(ns=15, nt=6)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
2	5	NA	140.4	133.1	NA	3.119681681	4.044219861	NA	2	#McKibbin (2006)
1	6	2	129.1	128.7	127.6	1.251172678	1.268890592	1.259761882	3	#Speyer (2016)
1	5	NA	115.6	114.1	NA	1.526334488	1.575013227	NA	2	#Attux (2013)
1	6	NA	-0.9	-5	NA	1.98	2.33	NA	2	#Baker (2015)
1	5	NA	120.6	117.8	NA	1.959635929	2.100857668	NA	2	#Brar (2005)
1	5	NA	-2.7	-1.1	NA	1.21	1.22	NA	2	#Daumit (2013)
2	5	NA	125.4	124.9	NA	6.073967149	5.115970865	NA	2	#Forsberg (2008)
1	5	NA	128.7	127	NA	2.96	2.86	NA	2	#Gilhoff (2010)
2	4	NA	127.5	125.3	NA	2.54	2.933986343	NA	2	#Scheewe (2013)
1	3	5	128.1	126.9	123.3	1.920553199	1.795890832	1.933356887	3	#Sugawara (2018)
```

```
1	4	NA	115	111.25	NA	4.999244943	2.952170811	NA	2	#Lee (2014)
1	6	NA	130.73	124.89	NA	2.285828807	2.547480548	NA	2	#Fernandez Guijarro 2019
1	4	NA	108.19	110.8	NA	2.350939022	2.189989185	NA	2	#Romain (2019)
2	3	NA	126.25	126.52	NA	3.069824674	2.27171341	NA	2	#Soric (2019)
1	6	NA	128	125	NA	1.216660658	1.366972252	NA	2	#Osborn 2018
END

list(d=c(NA, 0,0,0,0,0), sd=1, mu=c(0,0,0,0,0,	0,0,0,0,0, 0,0,0,0,0)

list(d=c(NA, -1,-1,-1,-1, -1), sd=1, mu=c(0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5)
```

Diastolic blood pressure

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#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Normal likelihood, identity link
# Random effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 w[i,1] <- 0 # adjustment for multi-arm trials is zero for control arm
 delta[i,1] <- 0 # treatment effect is zero for control arm
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + delta[i,k] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 for (k in 2:na[i]) { # LOOP THROUGH ARMS
 delta[i,k] ~ dnorm(md[i,k],taud[i,k]) # trial-specific LOR distributions
 md[i,k] <- d[t[i,k]] - d[t[i,1]] + sw[i,k] # mean of treat effects distributions (with multi-arm trial correction)
 taud[i,k] <- tau *2*(k-1)/k # precision of treat effects distributions (with multi-arm trial correction)
 w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]]) # adjustment for multi-arm RCTs
 sw[i,k] <- sum(w[i,1:k-1])/(k-1) # cumulative adjustment for multi-arm trials
 }
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD.
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

#Data
list(ns=13, nt=6)
```

```
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
2	5	NA	86.8	79.9	NA	2.414039396	2.041008154	NA	2	#McKibbin (2006)
1	5	NA	78.8	75.9	NA	1.341697252	1.329724282	NA	2	#Attux (2013)
2	6	NA	1.9	-1.1	NA	1.32	1.55	NA	2	#Baker (2015)
1	5	NA	-1.86	-0.6	NA	0.74	0.79	NA	2	#Daumit (2013)
2	5	NA	79.9	82.4	NA	3.522346246	3.097112407	NA	2	#Forsberg (2008)
1	5	NA	82.5	80.3	NA	2.06	1.96	NA	2	#Gilhoff (2010)
2	4	NA	78.6	75.5	NA	1.74	1.41128457	NA	2	#Scheewe (2013)
1	3	5	82.1	78.9	79.1	1.549246247	1.710372221	1.933356887	3	#Sugawara (2018)
1	4	NA	75	73.75	NA	2.672863633	1.831406563	NA	2	#Lee (2014)
1	6	NA	82.7	77.25	NA	1.93528637	1.360672103	NA	2	#Fernandez Guijarro (2019)
1	4	NA	65.64	68.32	NA	1.559103451	1.469726075	NA	2	#Romain (2019)
2	3	NA	82.72	80.23	NA	1.720130809	1.728591124	NA	2	#Soric (2019)
1	6	NA	82	81	NA	0.729996395	0.939793423	NA	2	#Osborn 2018
END

list(d=c(NA, 0,0,0,0,0), sd=1, mu=c(0,0,0,0,0,	0,0,0,0,0,	0,0,0)

list(d=c(NA, -1,-1,-1,-1, -1), sd=1, mu=c(0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5,0.5,0.5,	0.5,0.5,0.5)
```

HDL cholesterol

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#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Normal likelihood, identity link
# Random effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 w[i,1] <- 0 # adjustment for multi-arm trials is zero for control arm
 delta[i,1] <- 0 # treatment effect is zero for control arm
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + delta[i,k] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 for (k in 2:na[i]) { # LOOP THROUGH ARMS
 delta[i,k] ~ dnorm(md[i,k],taud[i,k]) # trial-specific LOR distributions
 md[i,k] <- d[t[i,k]] - d[t[i,1]] + sw[i,k] # mean of treat effects distributions (with multi-arm trial correction)
```

```
 taud[i,k] <- tau *2*(k-1)/k # precision of treat effects distributions (with multi-arm trial correction)
 w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]]) # adjustment for multi-arm RCTs
 sw[i,k] <- sum(w[i,1:k-1])/(k-1) # cumulative adjustment for multi-arm trials
 }
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,20) # vague prior for between-trial SD.
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS
```

```
#Data
list(ns=15, nt=6)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
2	5	NA	38.8	34.9	NA	2.04264872	1.795331247	NA	2	#McKibbin (2006)
1	6	2	46.32	46.32	46.32	1.370078451	1.409472715	1.409472715	3	#Speyer (2016)
1	5	NA	46.4	44.3	NA	1.464788743	1.626653005	NA	2	#Attux (2013)
1	5	NA	-0.1	0.6	NA	0.893	0.893	NA	2	#Daumit (2013)
2	5	NA	64.848	50.566	NA	4.175228377	3.621895372	NA	2	#Forsberg (2008)
1	6	NA	48.25	50.18	NA	1.415197316	1.294683359	NA	2	#Gaughran (2017)
1	5	NA	50.18	50.18	NA	1.97	1.97	NA	2	#Gilhoff (2010)
1	5	NA	46.32	46.32	NA	0.880411097	1.792174607	NA	2	#Holt (2019)
2	4	NA	38.67	42.54	NA	1.546	1.435424964	NA	2	#Scheewe (2013)
1	5	3	44.5	48.3	52.9	1.229154047	1.502684166	2.151019583	3	#Sugawara (2018)
1	4	NA	43.63	51.33	NA	7.247844507	6.618519472	NA	2	#Lee (2014)
1	6	NA	41.5	45.38	NA	1.343746008	1.449493754	NA	2	#Fernandez Gujirraro
1	4	NA	45.5	46.32	NA	1.897381655	2.262117371	NA	2	#Romain (2019)
2	3	NA	38.6	36.67	NA	1.919069168	2.015819256	NA	2	#Soric (2019)
1	6	NA	1.3	1.3	NA	0.032444284	0.051261459	NA	2	#Osborn 2018
END

list(d=c(NA,0,0,0,0,0), sd=1, mu=c(0,0,0,0,0,   0,0,0,0,0,     0,0,0,0,0)

list(d=c(NA, 1,1,1,1,1), sd=0.5, mu=c(1,1,1,1,1,    1,1,1,1,1,   1,1,1,1,1)
```

LDL cholesterol

#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Normal likelihood, identity link
# Fixed effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + d[t[i,k]] - d[t[i,1]] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
} # *** PROGRAM ENDS
```

```
#Data
list(ns=9, nt=6)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
2	5	NA	108.4	91.7	NA	6.815018911	5.867972686	NA	2	#McKibbin (2006)
1	5	NA	113.3	115.4	NA	4.23434729	4.455911973	NA	2	#Attux (2013)
1	5	NA	-0.9	-5.5	NA	3.418	2.724	NA	2	#Daumit (2013)
1	6	NA	106.922	115.028	NA	4.453709199	4.142986749	NA	2	#Gaughran (2017)
1	5	NA	119.66	123.52	NA	6.89	7.88	NA	2	#Gilhoff (2010)
1	4	NA	91.38	102	NA	12.66074692	10.63842152	NA	2	#Lee (2014)
1	4	NA	113.1	103.06	NA	6.697313205	7.493597524	NA	2	#Romain (2019)
2	3	NA	126.22	117.34	NA	5.163822399	5.779378178	NA	2	#Soric (2019)
1	6	NA	3.2	3.2	NA	0.07299964	0.076892189	NA	2	#Osborn 2018
END
```

```
list(d=c(NA,0,0,0,0,0), mu=c(0,0,0,0,0,   0,0,0,0)

list(d=c(NA, 1,1,1,1,1), mu=c(1,1,1,1,1,    1,1,1,1)
```

Total cholesterol

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#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Normal likelihood, identity link
# Fixed effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + d[t[i,k]] - d[t[i,1]] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
} # *** PROGRAM ENDS

#Data
list(ns=11, nt=6)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
2	5	NA	186.2	160.1	NA	7.836343271	6.878953409	NA	2	#McKibbin (2006)
1	5	NA	194.2	191.7	NA	4.77594985	5.40926674	NA	2	#Attux (2013)
1	5	NA	-0.3	-5.6	NA	3.801	3.163	NA	2	#Daumit (2013)
1	6	NA	187.596	191.456	NA	4.661826451	4.401923421	NA	2	#Gaughran (2017)
1	5	NA	216.16	208.44	NA	7.88	7.88	NA	2	#Gilhoff (2010)
1	5	NA	199.948	189.14	NA	3.228174022	3.584349213	NA	2	#Holt (2019)
1	5	NA	200.16	202.24	NA	2.949234914	2.98334849	NA	2	#Masa-Font (2015)
1	4	NA	165.75	182.5	NA	12.73499313	14.87752668	NA	2	#Lee (2014)
1	4	NA	187.6	176.79	NA	6.929978613	6.951187895	NA	2	#Romain (2019)
2	3	NA	196.47	193.77	NA	6.818783745	7.189407191	NA	2	#Soric (2019)
1	6	NA	5.5	5.4	NA	0.089221782	0.085435766	NA	2	#Osborn 2018
END

list(d=c(NA,0,0,0,0,0), mu=c(0,0,0,0,0,   0,0,0,0,0,    0))

list(d=c(NA, 1,1,1,1,1), mu=c(1,1,1,1,1,    1,1,1,1,1,  1))
```

Quality of Life: mental health


```
#Intervention categories#
#1= TAU#
#2= TAU+#
#3=Smoking#
#4=Diet+PA#
#5=Diet, PA, smoking, alcohol#

# Normal likelihood, identity link, trial-level data given as treatment differences
# Random effects model for two-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns2) { # LOOP THROUGH 2-ARM STUDIES
 y[i,2] ~ dnorm(delta[i,2],prec[i,2]) # normal likelihood for 2-arm trials
 var[i,2] <- pow(se[i,2],2) # calculate variances
```

```
 prec[i,2] <- 1/var[i,2] # set precisions
 dev[i,2] <- (y[i,2]-delta[i,2])*(y[i,2]-delta[i,2])*prec[i,2] #Deviance contribution
 delta[i,2] ~ dnorm(md[i,2],tau) # trial-specific treat effects distributions
 md[i,2] <- d[t[i,2]] - d[t[i,1]] # mean of treat effects distributions
 }
totresdev <- sum(dev[,2]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

#Data
list(ns2=9, nt=5)
t[,1]	t[,2]	y[,2]	se[,2]	#author#
1	4	-0.14	0.335	#Attux 2013
1	4	-0.11	0.184183673	#Masa-Font 2015
1	4	-0.05	0.452244898	#Usher 2013
1	5	-0.05	0.273979592	#Gaughran 2017
1	3	0.02	0.328673469	#Baker 2006
1	3	0.03	0.270816327	#Gilbody 2019
1	3	-0.17	0.485816327	#Peckham 2015
2	4	0.13	0.711836735	#Kilbourne 2012
2	5	-0.07	0.274183673	#Baker 2015
END

#Inits
#chain 1
list(d=c( NA, 0,0,0,0), sd=1)

#chain 1
list(d=c( NA, 0.5,0.5,0.5,0.5), sd=2)
```

Quality of life: physical health

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```
#Intervention categories#
#1= TAU#
#2= TAU+#
#3=Smoking#
#4=Diet+PA#
#5=Diet, PA, smok, alc#


# Normal likelihood, identity link, trial-level data given as treatment differences
# Random effects model for two-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns2) { # LOOP THROUGH 2-ARM STUDIES
 y[i,2] ~ dnorm(delta[i,2],prec[i,2]) # normal likelihood for 2-arm trials
 var[i,2] <- pow(se[i,2],2) # calculate variances
 prec[i,2] <- 1/var[i,2] # set precisions
 dev[i,2] <- (y[i,2]-delta[i,2])*(y[i,2]-delta[i,2])*prec[i,2] #Deviance contribution
 delta[i,2] ~ dnorm(md[i,2],tau) # trial-specific treat effects distributions
 md[i,2] <- d[t[i,2]] - d[t[i,1]] # mean of treat effects distributions
 }
totresdev <- sum(dev[,2]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
sd ~ dunif(0,5) # vague prior for between-trial SD
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

#Data
list(ns2=9, nt=5)
t[,1]	t[,2]	y[,2]	se[,2]	#author#
1	4	-0.11	0.357346939	#Attux 2013
1	4	0.08	0.333163265	#Masa-Font 2015
```

```
1	4	0.05	0.526734694	#Usher 2013
1	5	-0.23	0.13244898	#Gaughran 2017
1	3	0.26	0.50744898	#Baker 2006
1	3	0.18	0.375102041	#Gilbody 2019
1	3	0.04	0.632244898	#Peckham 2015
2	4	-0.1	0.537959184	#Kilbourne 2012
2	5	-0.21	0.167346939	#Baker 2015
END

#Inits
#chain 1
list(d=c( NA, 0,0,0,0), sd=1)

#chain 1
list(d=c( NA, 0.5,0.5,0.5,0.5), sd=2)
```

PANSS Total

#Intervention categories#

#1=TAU#

#2=Any risk behaviour intervention#

```
# Normal likelihood, identity link
# Fixed effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
 theta[i,k] <- mu[i] + d[t[i,k]] - d[t[i,1]] # model for linear predictor
 dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution
 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 }
totresdev <- sum(resdev[]) #Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
for (k in 2:nt){ d[k] ~ dnorm(0,.0001) } # vague priors for treatment effects
} # *** PROGRAM ENDS

#Data
list(ns=5, nt=2)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	na[]	#Author
1	2	NA	82	77	NA	6.30005291	5.775	NA	2	#Kaltsatou
2015
1	2	NA	60.9	63.9	NA	2.674771523	3.87758301	NA	2
	#Brar 2005
1	2	NA	54.8	43.5	NA	4.973317694	3.300466168	NA	2
	#Cordes 2011
1	2	NA	50.08	51.24	NA	1.113098968	1.192607149	NA	2
	#Gaughran 2017
1	2	NA	60.8	59.1	NA	2.24	2.191	NA	2	#Beebe 2005
END

list(d=c(NA, 0), mu=c(0,0,0,0,0)

list(d=c(NA, -1), mu=c(0.5,0.5,0.5,0.5,0.5)
```

Model 1b: Intervention effects model with covariates

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Weight

#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Binomial likelihood, logit link, subgroup
# Random effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 w[i,1] <- 0 # adjustment for multi-arm trials is zero for control arm
 delta[i,1] <- 0 # treatment effect is zero for control arm
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor, covariate effect relative to treat in arm 1
 theta[i,k] <- mu[i] + delta[i,k] + (beta1[t[i,k]]-beta1[t[i,1]])* init_antipsyc[i] + (beta2[t[i,k]]-beta2[t[i,1]])*comorb[i] +(beta3[t[i,k]]-
beta3[t[i,1]]) *indiv[i] + (beta4[t[i,k]]-beta4[t[i,1]])*inpat[i] + (beta5[t[i,k]]-beta5[t[i,1]])*tailor_smi[i]

dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution

 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 for (k in 2:na[i]) { # LOOP THROUGH ARMS
 delta[i,k] ~ dnorm(md[i,k],taud[i,k]) # trial-specific LOR distributions
 md[i,k] <- d[t[i,k]] - d[t[i,1]] + sw[i,k] # mean of LOR distributions (with multi-arm trial correction)
 taud[i,k] <- tau *2*(k-1)/k # precision of LOR distributions (with multi-arm trial correction)
 w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]]) # adjustment for multi-arm RCTs
 sw[i,k] <- sum(w[i,1:k-1])/(k-1) # cumulative adjustment for multi-arm trials
 }
 }
totresdev <- sum(resdev[]) # Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
beta1[1] <- 0 # covariate effect is zero for reference treatment
beta2[1] <- 0 # covariate effect is zero for reference treatment
beta3[1] <- 0 # covariate effect is zero for reference treatment
beta4[1] <- 0 # covariate effect is zero for reference treatment
beta5[1] <- 0 # covariate effect is zero for reference treatment
for (k in 2:nt){ # LOOP THROUGH TREATMENTS
 d[k] ~ dnorm(0,.0001) # vague priors for treatment effects
 beta1[k] <- B1 # common covariate effect
beta2[k] <- B2 # common covariate effect
beta3[k] <- B3 # common covariate effect
beta4[k] <- B4 # common covariate effect
beta5[k] <- B5 # common covariate effect
 }
B1 ~ dnorm(0,.0001) # vague prior for covariate effect
B2 ~ dnorm(0,.0001) # vague prior for covariate effect
B3 ~ dnorm(0,.0001) # vague prior for covariate effect
B4 ~ dnorm(0,.0001) # vague prior for covariate effect
```

```
B5 ~ dnorm(0,.0001) # vague prior for covariate effect


sd ~ dunif(0,10) # vague prior for between-trial SD
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS




list(ns=30, nt=6)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	init_antipsyc[]	comorb[]
	indiv[]	inpat[]	tailor_smi[]		na[]	#Author
1	4	NA	78.14	73.89	NA	3.733523805		3.956009353		NA	0	0
	0	0	0	2	#Battaglia (2013)
1	3	NA	81.55	82.99	NA	4.893178926		6.236011546		NA	1	0
	1	0	0	2	#Scocco (2006)
1	5	3	82.4	79.5	77.9	1.498031495		1.441599443		1.991361943	0
	0	1	0	0	3	#Sugawara (2018)
1	4	NA	81.5	82.8	NA	2.245365598		1.75	NA	0	0	0
	0	0	2	#Marzolini (2009)
1	5	NA	0.83	-0.27	NA	0.540936688		0.698267946		NA	0	0
	1	1	0	2	#Methapatara (2011)
2	5	NA	99.5	98.73	NA	3.147535982		4.01965217		NA	0	1
	0	0	1	2	#McKibbin (2006
1	5	NA	33.9	33	NA	1.145512986		0.84016805		NA	0	0
	0	0	1	2	#Usher (2013)
1	5	NA	-0.62	-2.45	NA	0.169705627		0.37123106		NA	0	0
	0	0	0	2	#Weber (2006)
2	5	NA	67.2	63.4	NA	0.459619408		0.459619408		NA	0	0
	1	1	1	2	#Wu (2008)
1	5	NA	0.2	-3.6	NA	0.683536555		0.671317113		NA	0	0
	1	0	1	2	#Mauri (2008)
1	5	5	0.68	-1.23	-1.16	0.940452019		0.67	0.78	0	0	1
	0	1	3	#Ratliff (2012)
1	5	NA	84.7	80.7	NA	2.203337689		1.820302173		NA	0	0
	0	0	0	2	#Attux 2013
1	5	NA	-1.1	-2	NA	0.511280851		0.649979638		NA	0	0
	0	0	0	2	#Brar (2005)
1	6	NA	79	81.9	NA	3.535533906		4.187986482		NA	1	0
	0	0	1	2	#Cordes 2011
1	5	NA	-0.2	-3.4	NA	0.765443091		0.663689712		NA	0	0
	1	0	1	2	#Daumit 2013
1	5	NA	6	2	NA	0.783929496		0.750651891		NA	1	0
	1	0	0	2	#Evans 2005
2	5	NA	90	96	NA	7.40524762		5.259051155		NA	0	0
	0	0	0	2	#Forsberg 2008
1	5	NA	85	83.2	NA	2.933263967		2.806421894		NA	0	0
	0	0	1	2	#Gilhoff 2010
1	5	NA	95.3	92.3	NA	8.579793537		3.250494468		NA	0	0
	0	0	0	2	#Iglesias-Garcia 2010
2	5	NA	83.5	88	NA	3.586447922		2.98	NA	0	0	0
	0	0	2	#Khazaal 2007
2	5	NA	-1.48	-3.94	NA	0.502451135		0.674074078		NA	0	0
	1	0	0	2	#Kwon 2006
1	5	NA	85.36	81.66	NA	3.284269434		2.586172019		NA	0	0
	1	0	1	2	#Littrell 2003
1	5	NA	101.3	104.1	NA	1.801877633		1.632767021		NA	0	0
	0	0	1	2	#Holt 2019
2	6	NA	-0.1	0.6	NA	0.66	0.23	NA	0	0	1	0
	0	2	#Baker 2015
1	6	NA	93.29	94.55	NA	3.229737347		4.269108723		NA	0	1
	0	0	0	2	#Fernandez Guijarro 2019
1	5	NA	102.73	90.5	NA	7.479572737		4.615105633		NA	0	0
	1	0	0	2	#Sylvia 2019
1	4	NA	100.13	93.38	NA	3.49	3.04	NA	0	0	1	0
	0	2	#Romain 2019
2	3	NA	86.92	87.17	NA	2.388975291		2.70168522		NA	0	1
	1	1	0	2	#Soric 2019
1	5	NA	109.09	102.59	NA	3.780445594		3.023781274		NA	0	0
	1	0	0	2	#Brown 2011
1	6	2	102.9	103.1	103.7	1.925563625		2.172632811		1.990058626	0
	0	1	0	0	3	#Speyer 2016
END

#Initial values
```

```
list(d=c(NA, 0,0,0,0,0), mu=c(0,0,0,0,0,   0,0,0,0,0,    0,0,0,0,0,      0,0,0,0,0,     0,0,0,0,0,   0,0,0,0,0), sd=0.5, B1=0, B2=0, B3=0, B4=0, B5=0

list(d=c(NA, 1,1,1,1,1), mu=c(1,1,1,1,1,   1, 1,1,1,1,   1,1,1,1,1,      1,1,1,1,1,    1,1,1,1,1,   1,1,1,1,1), sd=1, B1=1, B2=1, B3=1, B4=1, B5=1
```

BMI

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#Intervention categories#

#1=TAU#

#2=TAU+#

#3= Diet alone#

#4= Physical activity alone#

#5=Diet and physical activity#

#6=Diet, physical activity, smoking, and alcohol#

```
# Binomial likelihood, logit link, subgroup
# Random effects model for multi-arm trials
model{ # *** PROGRAM STARTS
for(i in 1:ns){ # LOOP THROUGH STUDIES
 w[i,1] <- 0 # adjustment for multi-arm trials is zero for control arm
 delta[i,1] <- 0 # treatment effect is zero for control arm
 mu[i] ~ dnorm(0,.0001) # vague priors for all trial baselines
 for (k in 1:na[i]) { # LOOP THROUGH ARMS
 var[i,k] <- pow(se[i,k],2) # calculate variances
 prec[i,k] <- 1/var[i,k] # set precisions
 y[i,k] ~ dnorm(theta[i,k],prec[i,k]) # normal likelihood
# model for linear predictor, covariate effect relative to treat in arm 1
 theta[i,k] <- mu[i] + delta[i,k] + (beta1[t[i,k]]-beta1[t[i,1]])* init_antipsyc[i] + (beta2[t[i,k]]-beta2[t[i,1]])*comorb[i] +(beta3[t[i,k]]-beta3[t[i,1]])*indiv[i] + (beta4[t[i,k]]-beta4[t[i,1]])*inpat[i] + (beta5[t[i,k]]-beta5[t[i,1]])*tailor_smi[i]

dev[i,k] <- (y[i,k]-theta[i,k])*(y[i,k]-theta[i,k])*prec[i,k] #Deviance contribution

 }
 resdev[i] <- sum(dev[i,1:na[i]]) # summed residual deviance contribution for this trial
 for (k in 2:na[i]) { # LOOP THROUGH ARMS
 delta[i,k] ~ dnorm(md[i,k],taud[i,k]) # trial-specific LOR distributions
 md[i,k] <- d[t[i,k]] - d[t[i,1]] + sw[i,k] # mean of LOR distributions (with multi-arm trial correction)
 taud[i,k] <- tau *2*(k-1)/k # precision of LOR distributions (with multi-arm trial correction)
 w[i,k] <- (delta[i,k] - d[t[i,k]] + d[t[i,1]]) # adjustment for multi-arm RCTs
 sw[i,k] <- sum(w[i,1:k-1])/(k-1) # cumulative adjustment for multi-arm trials
 }
 }
totresdev <- sum(resdev[]) # Total Residual Deviance
d[1]<-0 # treatment effect is zero for reference treatment
beta1[1] <- 0 # covariate effect is zero for reference treatment
beta2[1] <- 0 # covariate effect is zero for reference treatment
beta3[1] <- 0 # covariate effect is zero for reference treatment
beta4[1] <- 0 # covariate effect is zero for reference treatment
beta5[1] <- 0 # covariate effect is zero for reference treatment
for (k in 2:nt){ # LOOP THROUGH TREATMENTS
 d[k] ~ dnorm(0,.0001) # vague priors for treatment effects
 beta1[k] <- B1 # common covariate effect
beta2[k] <- B2 # common covariate effect
beta3[k] <- B3 # common covariate effect
beta4[k] <- B4 # common covariate effect
beta5[k] <- B5 # common covariate effect
```

```
 }
B1 ~ dnorm(0,.0001) # vague prior for covariate effect
B2 ~ dnorm(0,.0001) # vague prior for covariate effect
B3 ~ dnorm(0,.0001) # vague prior for covariate effect
B4 ~ dnorm(0,.0001) # vague prior for covariate effect
B5 ~ dnorm(0,.0001) # vague prior for covariate effect


sd ~ dunif(0,10) # vague prior for between-trial SD
tau <- pow(sd,-2) # between-trial precision = (1/between-trial variance)
} # *** PROGRAM ENDS

list(ns=34, nt=6)
t[,1]	t[,2]	t[,3]	y[,1]	y[,2]	y[,3]	se[,1]	se[,2]	se[,3]	init_antipsyc[]	comorb[]
	indiv[]	inpat[]	tailor_smi[]		na[]	#Author
1	4	NA	29.17	27.22	NA	0.947523087	1.170042734	NA	0	0
	0	0	0	2	#Battaglia (2013)
1	3	NA	27.47	30.64	NA	1.248043469	2.507686185	NA	1	0
	1	0	0	2	#Scocco (2006)
1	5	3	30.4	29.7	29.2	0.550558584	0.5497625	0.610847222	0
	0	1	0	0	3	#Sugawara (2018)
1	4	NA	32	32.13	NA	2.757716447	1.368251622	NA	0	1
	1	0	0	2	#Lee (2014)
1	4	NA	81.5	82.8	NA	2.245365598	1.75	NA	0	0	0
	0	0	2	#Marzolini (2009)
1	5	NA	0.26	-0.12	NA	0.196222132	0.240416306	NA	0	0
	1	1	0	2	#Methapatara (2011)
1	5	NA	33.9	32.9	NA	1.225589232	1.247282761	NA	0	1
	0	0	1	2	#McKibbin (2006
1	6	2	34.4	33.9	34.5	0.559034601	0.538593848	0.575108685	0
	0	1	0	0	3	#Speyer (2016)
1	5	NA	33.9	33	NA	1.145512986	0.84016805	NA	0	0
	0	0	1	2	#Usher (2013)
1	5	NA	-0.24	1.22	NA	0.431335137	0.37123106	NA	0	0
	0	0	0	2	#Weber (2006)
2	5	NA	25.4	23.1	NA	0.153795725	0.153795725	NA	0	0
	1	1	1	2	#Wu (2008)
1	5	NA	0	-1.3	NA	0.259272486	0.232379001	NA	0	0
	1	0	1	2	#Mauri (2008)
2	5	NA	30.4	31.3	NA	0.610658027	0.77482717	NA	0	0
	0	0	0	2	#Melamed (2008)
1	5	NA	29.1	29.9	NA	0.640075753	0.606767391	NA	0	0
	0	0	0	2	#Attux 2013
1	6	NA	26.7	28.4	NA	0.848528137	0.748845265	NA	1	0
	0	0	1	2	#Cordes 2011
1	5	NA	-0.1	-1.2	NA	0.255442325	0.229174624	NA	0	0
	1	0	1	2	#Daumit 2013
1	4	NA	24.8	23.1	NA	0.542217668	0.35	NA	0	0	0
	0	0	2	#Kalsatou 2015
1	5	NA	2	0.7	NA	0.27136021	0.250217297	NA	1	0
	1	0	0	2	#Evans 2005
2	5	NA	29.3	31.1	NA	1.664100589	1.614812388	NA	0	0
	0	0	0	2	#Forsberg 2008
1	5	NA	28.7	28.1	NA	0.840991478	0.790348025	NA	0	0
	0	0	1	2	#Gilhoff 2010
1	5	NA	33.7	32	NA	2.418972627	1.511857892	NA	0	0
	0	0	0	2	#Iglesias-Garcia 2010
2	5	NA	28.5	31	NA	1.000869187	1.08	NA	0	0	0
	0	0	2	#Khazaal 2007
2	5	NA	-0.59	-1.5	NA	0.195100707	0.248831753	NA	0	0
	1	0	0	2	#Kwon 2006
1	5	NA	28.18	26.39	NA	0.943192148	0.650768776	NA	0	0
	1	0	1	2	#Littrell 2003
1	6	NA	-0.01	-0.2	NA	0.431113458	0.280652142	NA	0	0
	1	1	0	2	#Hjorth 2014
1	5	NA	34.8	35.6	NA	0.555008723	0.557152727	NA	0	0
	0	0	1	2	#Holt 2019
2	6	NA	0	0.4	NA	0.213637709	0.251960981	NA	0	0
	1	0	0	2	#Baker 2015
1	4	NA	33.19	32.05	NA	1.039402301	0.910062173	NA	0	0
	1	0	0	2	#Romain 2019
2	3	NA	26.96	28.16	NA	0.677419411	0.877351386	NA	0	1
	1	1	0	2	#Soric 2019
1	6	NA	33.19	31.61	NA	0.963991701	1.135783241	NA	0	1
	0	0	0	2	#Fernandez Gujjiro 2019
```

```
1	5	NA	36.1	32.6	NA	2.107328483	1.137135402	NA	0	0
	1	0	0	2	#Sylvia 2019
1	6	NA	32	32	NA	0.59805036	0.567774974	NA	0	1
	1	0	0	2	#Osborn 2018
1	5	NA	32.34	32.38	NA	0.426093685	0.476153846	NA	0	0
	0	0	0	2	#Masa-Font 2015
1	5	NA	-0.5	-0.9	NA	0.195634795	0.236668047	NA	0	0
	0	0	0	2	#Brar 2005
END
```

```
list(d=c(NA, 0,0,0,0,0), mu=c(0,0,0,0,0,   0,0,0,0,0,    0,0,0,0,0,      0,0,0,0,0,     0,0,0,0,0,   0,0,0,0,0,  0,0,0,0), sd=0.5, B1=0,
B2=0, B3=0, B4=0, B5=0
```

```
list(d=c(NA, 1,1,1,1,1), mu=c(1,1,1,1,1,   1, 1,1,1,1,   1,1,1,1,1,      1,1,1,1,1,    1,1,1,1,1,   1,1,1,1,1,  1,1,1,1), sd=1, B1=1,
B2=1, B3=1, B4=1, B5=1
```

References

1. Dias S, Sutton AJ, Ades AE, Welton NJ. Evidence synthesis for decision making 2: a generalized linear modeling framework for pairwise and network meta-analysis of randomized controlled trials. Med Decis Making. 2013;33(5):607-17.

2. Dias S, Sutton AJ, Welton NJ, Ades AE. Evidence synthesis for decision making 3: heterogeneity--subgroups, meta-regression, bias, and bias-adjustment. Med Decis Making. 2013;33(5):618-40.