Multilevel Models for Other Non-Normal Outcomes in Mplus v. 7.11

Study Overview:

These data come from a daily diary study that followed 41 male and female college students over a six-week period to examine within-person relationships among hyperarousal symptoms, alcohol use, and perpetration of intimate partner violence (IPV). To be eligible, potential participants had to be currently involved in a romantic relationship and have face-to-face contact with their partner at least once a week with no intentions of breaking up with their partner in the preceding six weeks. In addition, participants had to report using alcohol in the previous six weeks with no intention of abstaining from future alcohol use, and perpetrating or experiencing at least one instance of physical (e.g., pushing, shoving, slapping/punching, or choking), sexual (e.g., using threats or physical force to obtain sex), or psychological abuse (e.g., calling the partner stupid, worthless, or ugly) in the previous six months. Below are the distributions of the hyperarousal predictor (left) and intimate partner violence outcome (right) across all daily observations.



We will be examining several candidate models for IPV: Normal, Logit, Poisson, Negative Binomial, Negative Binomial Hurdle, and Two-Part Log. Although it may be somewhat suspect given its distribution, for the sake of illustration we will treat hyperarousal as normal across models. We are, however, using the MLR estimator (i.e., robust maximum likelihood) that corrects the parameter standard errors (via the "sandwich" method) for non-normality.

Non-Normal Multilevel Outcomes in Mplus 1 of 8

Model 1: Normal Response Distribution

TITLE: Model 1: Normal Response Distribution	MODEL RESULTS					
DATA: FILE IS MPlusData.csv;	Two-Tailed					
VARIABLE: NAMES ARE ID hyper alc perp perpr;	Estimate S.E. Est./S.E. P-Value					
USEVARIABLES ARE hyper perp;	Within Level					
MISSING ARE ALL (-99);						
CLUSTER IS ID;	FOR EVERY UNIT INCREASE IN HYPER, PERP INCREASES BY 396					
! No extra code here means we assume each item response is normal	IF YOU EXPERIENCE MORE HYPER IN COMPARISON TO OWN MEAN, THEN MORE PERP					
DEFINE: CENTER hyper (GRANDMEAN):	IPV THAT DAY					
ANALYSIS: ESTIMATOR IS MLR; TYPE = TWOLEVEL RANDOM;	PERP ON					
	HYPER 0.396 0.112 3.547 0.000					
MODEL:						
%WITHIN%	RESIDUAL VARIANCE (NOTHING PREDICTING HYPER)					
hyper* perp*; ! Level-1 residual variances	Variances					
perp ON hyper*; ! Level-1 relationship (within person)	HYPER 0.132 0.024 5.577 0.000					
%BETWEEN%	RESIDUAL LEFT OVER VARIANCE (PERP IS PREDICTED BY HYPER)					
hyper* perp*; ! Level-2 random intercept variances	Residual Variances					
[hyper* perp*]; ! Fixed intercepts	PERP 0.783 0.242 3.230 0.001					
perp ON hyper*; ! Level-2 relationship (between person)						
	Between Level					
Estimated Intraclass Correlations for the Y Variables						
Intraclass Intraclass	EXPERIENCING MORE HYPER IN COMPARISON TO OTHER PERSONS DOES NOT					
Variable Correlation Variable Correlation	SIGNIFICANTLY PREDICT PERP OF IPV					
PERP 0.521 HYPER 0.464	PERP ON					
	HYPER 0.850 0.465 1.828 0.067					
Number of Free Parameters 8						
Loglikelihood	FIXED INTERCEPT FOR HYPER					
H0 Value -1385.261	(HYPER IS UNCONDITIONAL SINCE IT IS NOT BEING PREDICTED BY ANYTHING)					
H0 Scaling Correction Factor 7.021	Means					
for MLR	HYPER 0.034 0.055 0.618 0.536					
H1 Value -1385.261						
H1 Scaling Correction Factor 7.021	FIXED INTERCEPT (CONDITIONAL ON HYPER: IS AMOUNT OF IPV PERPETRATED BY					
for MLR	SOMEONE AVERAGE ON HYPER ACROSS DAYS)					
	Intercepts					
Information Criteria	PERP 0.561 0.146 3.848 0.000					
Akaike (AIC) 2786.522						
Bayesian (BIC) 2826.243	RANDOM INTERCEPT VARIANCE (NOTHING PREDICTING HYPER)					
Sample-Size Adjusted BIC 2800.833	Variances					
$(n^* = (n + 2) / 24)$	HYPER 0.115 0.025 4.663 0.000					
Chi-Square Test of Model Fit	RANDOM INTERCEPT LEFT OVER VARIANCE (PERP IS PREDICTED BY HYPER)					
Value 0.000*	Residual Variances					
Degrees of Freedom 0	PERP 0.793 0.460 1.725 0.084					
P-Value 0.0000						
Scaling Correction Factor 1.000						
for MLR						
RMSEA (Root Mean Square Error Of Approximation)						
Estimate 0.000						
CFI/TLI						
CFI 1.000						
TLI 1.000	1					

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Model 2: Logit Model

TITLE: Model 2: Logit Model	MODEL RESULTS					
DATA: FILE IS MPlusData.csv;	Two-Tailed					
	Estimate S.E. Est./S.E. P-Value					
VARIABLE: NAMES ARE ID hyper alc perp perpr;	Within Level					
USEVARIABLES ARE hyper perpr;						
MISSING ARE ALL (-99):	PREDICTING WHETHER OR NOT A PERSON WILL PERPETRATE MORE THAN USUAL:					
CLUSTER IS ID:	FOR EVERY INIT INCREASE IN HYPER. THE LOGIT OF PERPR INCREASES BY 1.55					
CATEGORICAL IS perpr	DEPERT ON					
L Perp is now binary only						
DEFINE: CENTER http://CRANDWEAN);	HIFER 1.547 0.430 5.547 0.000					
DEFINE. CEATER Hyper (GRANDEEAN),	DESTDUAL VADIANCE (NOMULING DEDICATING UNDED)					
	VENDOR FOR THE CARTANCE (NOTHING FREDICTING RIFER)					
ANALISIS: ESTIMATOR IS MLR; TIPE = TWOLEVEL RANDOM;						
	HYPER 0.132 0.024 5.578 0.000					
MODET:	Retween revel					
WITHIN						
hyper*; ! Level-1 residual variance for hyper only	INTERCEPT VARIANCE IN HYPER HAS BEEN 'MOVED' TO BHYPER TO TRICK MPLUS					
perpr ON hyper*; ! Level-1 relationship (within person)	BHYPER BY					
	HYPER 1.000 0.000 999.000 999.000					
%BETWEEN%						
Bhyper BY hyper@1; ! Separate hyper using latent variable "Bhyper"	PREDICT RANDOM INTERCEPT: IF MORE HYPER THAN OTHERS, AMOUNT OF VIOLENCE					
hyper@0 Bhyper*; ! Level-2 random intercept variance is now Bhyper	PERPETRATED INCREASES BY .50 FOR EVERY UNIT INCREASE IN HYPER (NON-SIG)					
[hyper@0 Bhyper*]; ! Fixed intercept is now from Bhyper	PERPR ON					
<pre>perpr*; ! Level-2 random intercept variance</pre>	BHYPER 0.503 0.840 0.598 0.544					
[perpr\$1]; ! Threshold (opposite of fixed intercept in logits)						
perpr ON Bhyper*; ! Level-2 relationship (between person)	FIXED INTERCEPT FOR HYPER HAS BEEN 'MOVED' TO BHYPER TO TRICK MPLUS					
	Intercepts					
Number of Free Parameters 7	HYPER 0.000 0.000 999.000 999.000					
	Means					
Loglikelihood	BHYPER 0.034 0.056 0.613 0.540					
H0 Value -712.033						
H0 Scaling Correction Factor 3.178	LOGIT OF THE PROBABILITY OF NOT PERPETRATING VIOLENCE ON AVERAGE ACROSS					
for MLR	DAYS FOR SOMEONE WHO IS AT MEAN HYPER RELATIVE TO OTHERS					
	Thresholds					
Information Criteria	PERPR\$1 1.996 0.272 7.328 0.000					
Akaike (ATC) 1438 067						
Bavecian (BIC) 1472-823	RANDOM INTERCEPT VARIANCE (NOTHING DEFITCTING IT)					
Somelou Sige Adjusted PTC 1450 520						
Sample-Size Aujusteu Bic 1450.569						
$(11^{*} = (11 + 2) / 24)$	BHIPER 0.114 0.025 4.05/ 0.000					
	RANDOM INTERCEDT LEET OVER VARIANCE (DERD IS DEEDICTED BY HYDED)					
	Bogidual Variange					
	PERFR 1.043 U./11 2.392 U.010					
	HIPER 0.000 0.000 999.000 999.000					

Model 3a: Poisson Model

TITLE: Model 3a and 3b:	MODEL RESULTS
Poisson and Negative Binomial (Predicting Log of Count)	Two-Tailed
	Estimate S.E. Est./S.E. P-Value
DATA: FILE IS MPlusData.csv;	
	Within Level
VARIABLE: NAMES ARE ID hyper alc perp perpr;	
USEVARIABLES ARE hyper perp;	PREDICTING LOG COUNT OF HOW MUCH SOMEONE PERPS MORE THAN USUAL WHEN
MISSING ARE ALL (-99);	HYPER IS MORE THAN USUAL (MARGINALLY SIGNIFICANT)
CLUSTER IS ID;	PERP ON
COUNT IS perp (p);	HYPER 0.488 0.250 1.952 0.051
! Now perp is poisson	
	RESIDUAL VARIANCE (NOTHING PREDICTING HYPER)
DEFINE: CENTER hyper (GRANDMEAN);	Variances
	HYPER 0.132 0.024 5.577 0.000
ANALYSIS: ESTIMATOR IS MLR: TYPE = TWOLEVEL RANDOM:	
	Between Level
MODEL:	
	INTERCEPT VARIANCE IN HYPER HAS BEEN 'MOVED' TO BHYPER TO TRICK MPLUS
\$WITHIN\$	BHYPER BY
hvper*: ! Level-1 residual variance for hvper only	HYPER 1,000 0,000 999,000 999,000
perp ON hyper*: ! Level-1 relationship (within person)	
	EXPERIENCING MORE HYPER THAN OTHERS ON AVERAGE ACROSS DAYS DOES NOT
BETWEEN	PREDICT LOG COUNT OF HOW MUCH IPV SOMEONE PERPS ON AVERAGE
Bhyper BY hyper@1: ! Separate hyper using latent variable "Bhyper"	PERP ON
hvper@0 Bhvper*: ! Level-2 random intercept variance is now Bhvper	BHYPER 1.128 0.747 1.509 0.131
[hyper(0 Bhyper*1: ! Fixed intercept is now from Bhyper	
perp*: ! Level-2 random intercept variance	FIXED INTERCEPT FOR HYPER HAS BEEN 'MOVED' TO BHYPER TO TRICK MPLUS
[perp*]: ! Fixed intercept	Means
perp ON Bhyper*; ! Level-2 relationship (between person)	BHYPER 0.035 0.056 0.636 0.525
	Intercepts
Number of Free Parameters 7	HYPER 0.000 0.000 999.000 999.000
Loglikelihood	FIXED INTERCEPT (CONDITIONAL ON HYPER: IS LOG COUNT OF IPV PERPETRATED
H0 Value -920.516	BY SOMEONE AVERAGE ON HYPER ACROSS DAYS)
H0 Scaling Correction Factor 3.550	PERP -1.629 0.273 -5.973 0.000
for MLR	
	RANDOM INTERCEPT VARIANCE (NOTHING PREDICTING HYPER)
Information Criteria	Variances
Akaike (AIC) 1855.032	BHYPER 0.114 0.024 4.675 0.000
Bayesian (BIC) 1889.788	
Sample-Size Adjusted BIC 1867.555	RANDOM INTERCEPT LEFT OVER VARIANCE (PERP IS PREDICTED BY HYPER)
$(n^* = (n + 2) / 24)$	Residual Variances
	HYPER 0.000 0.000 999.000 999.000
	PERP 1.909 0.597 3.199 0.001

Model 3b: Negative Binomial

TITLE: Model 3b: Negative Binomial (Predicting Log of Count still)	MODEL RESULTS					
DATA: FILE IS MPlusData.csv;				Т	wo-Tailed	
		Estimate	S.E.	Est./S.E.	P-Value	
VARIABLE: NAMES ARE ID hyper alc perp perpr;						
USEVARIABLES ARE hyper perp;	Within Level					
MISSING ARE ALL (-99);						
CLUSTER IS ID;	PREDICTING LOG COUN	T OF HOW MUCH	SOMEONE	PERPS MORE	THAN USUAL WHEN	
COUNT IS perp (nb);	HYPER IS MORE THAN	USUAL (MARGIN	ALLY SIGN	IFICANT)		
! Now perp is Negative Binomial	PERP ON	•				
	HYPER	1.350	0.359	3.758	0.000	
DEFINE: CENTER byper (GRANDMEAN):		1.000	0.000	51/50	0.000	
	RESTRUAT. VARTANCE	NOTHING PREDI	CTTNG HYP	EB)		
ANALYSTS - FSTTMATOR TS MLR - TYDE - TWOLEVEL RANDOM -	Variances	(1011110 11001				
	UVDED	0 132	0 024	5 577	0 000	
	HIPER	0.132	0.024	5.577	0.000	
PODEL.	NORDERCUINESS EXCRC	ים אום הידים מוא // מ	ספיייים	AN DOTOCON	WUTCH TO INDICATED	
0.LTT MUT NO.	"STRETCHINESS FACTOR" - NB FITS BETTER THAN POISSON, WHICH IS INDICATED					
	BI SIG. P-VALUE OR	-ZALL. IF POI	.550N F115	OK DISPERS	TON SHOULD EQUAL ()	
nyper*; ! Level-1 residual variance for nyper only	Dispersion	0 4 4 1	0 670		0.000	
perp ON hyper*; ! Level-1 relationship (within person)	PERP	2.441	0.679	3.595	0.000	
	_					
BETWEEN	Between Level					
Bhyper BY hyper@1; ! Separate hyper using latent variable "Bhyper"						
hyper@0 Bhyper*; ! Level-2 random intercept variance is now Bhyper	INTERCEPT VARIANCE IN HYPER HAS BEEN 'MOVED' TO BHYPER TO TRICK MPLUS					
[hyper@0 Bhyper*]; ! Fixed intercept is now from Bhyper	BHYPER BY					
<pre>perp*; ! Level-2 random intercept variance</pre>	HYPER	1.000	0.000	999.000	999.000	
[perp*]; ! Fixed intercept						
<pre>perp ON Bhyper*; ! Level-2 relationship (between person)</pre>	EXPERIENCING MORE H	IYPER THAN OTH	IERS ON AV	ERAGE ACROS	S DAYS DOES NOT	
	PREDICT LOG COUNT C	OF HOW MUCH IF	V SOMEONE	PERPS ON A	VERAGE	
Number of Free Parameters 8	PERP ON					
	BHYPER	0.519	0.784	0.663	0.508	
Loglikelihood						
H0 Value -870.761	FIXED INTERCEPT FOR	R HYPER HAS BE	EN 'MOVED	' TO BHYPER	TO TRICK MPLUS	
H0 Scaling Correction Factor 2.918	Means					
for MLR	BHYPER	0.034	0.056	0.614	0.539	
	Intercepts					
Information Criteria	HYPER	0.000	0.000	999.000	999.000	
Akaike (AIC) 1757 522		0.000	0.000	555.000	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Bayesian (BIC) 1797-243	FIXED INTERCEPT (CC	NO TTTONAL ON	HYPER . TS	LOG COUNT	OF TEV PERPETRATED	
Somple Sige Adjusted PIC 1771.23	BY SOMEONE AVERAGE	ON HYDER ACRO	MILDIN: 10	HOG COOMI		
$\begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$	DEBD	_1 622	0 275	- F 901	0 000	
$(11^{\circ} - (11^{\circ} 2)^{\circ} / 24)$	PERP	-1.022	0.275	-2.091	0.000	
	DANDON THEEDCEDE VA	DIANCE (NOULT	NO DREDTO	THC HYDED		
	Variandon INTERCEPT VA	ATTANCE (NOTHI	ING PREDIC	IING HIPER)		
	Variances	0 114	0 004	4 665	0.000	
	BHIDEK	0.114	0.024	4.665	0.000	
			NOR (DE			
	KANDOM INTERCEPT LE	SFT OVER VARIA	NCE (PERP	IS PREDICT	ED BY HYPER)	
	Residual Variances					
	HYPER	0.000	0.000	999.000	999.000	
	PERP	1.869	0.665	2.809	0.005	

Model 4: Negative Binomial Hurdle

TITLE: Model 4: Ne	egative Binom	ial Hurdle	1		MODEL RES	ULTS				
Predicting 0, then Log of Count							Т	wo-Tailed		
DATA: FILE IS MP	LusData.csv;					E	Istimate	S.E.	Est./S.E.	P-Value
					Within Le	vel				
VARIABLE: NAMES ARE ID hyper alc perp perpr:										
USEVAR	LABLES ARE hv	per perp:			IF PERSON	PERPETRATES	S. HYPER MO	ORE THAN US	UAL DOES NO	T PREDICT HOW MUCH
MISSING		9):			TPV THEY	PERP THAT DA	Y			
CLUSTER	יחד פיד א				DEDD					
COUNT	(nbh)				LIVLE	OIN	0 072	0 174	0 4 2 1	0 674
	ivo binomial	'hurdlo (i	f 0 and how	much	TE UTCUER			0.1/4	U.421 V TO NNOT 1	(0.0/4 (0.0/4
: NOW perp is negative	LIVE DINOMIAL	nurare (r		muen)	IF HIGHER	NOR HIPER IN	DECDEACEC	DESS LIKEL		UVDED MUAN HOUAT
				LOGIT OF	NOT HITTING	DECREASES	DI -1.5 PE.	R UNIT MORE	HIPER THAN USUAL	
DEFINE: CENTER	nyper (GRAND	MEAN);			PERP#1	ON	1 546	0 406	2 544	0.000
ANALYSIS: ESTIMA	FOR IS MLR; T	YPE = TWOL	EVEL RANDOM	;	HYPER	<u>.</u>	-1.546	0.436	-3.544	0.000
MODEL:					RESIDUAL VARIANCE (NOTHING PREDICTING HYPER)					
%WITHIN%					Variances	5				
hyper*;	! Level-1 r	esidual va	riance for	hyper only	HYPER	<u>.</u>	0.132	0.024	5.577	0.000
<pre>perp ON hyper*;</pre>	! Level-1 r	elationshi	p for log c	ount						
<pre>perp#1 ON hyper*;</pre>	! Level-1 r	elationshi	p for is 0?		"STRETCHI	NESS FACTOR"	/ - NB FITS	S BETTER TH	AN POISSON,	WHICH IS INDICATED
					BY SIG. F	-VALUE OR -2	2ALL. IF PO	DISSON FITS	OK DISPERS	ION SHOULD EQUAL 0)
8BETWEEN8					IS WAY RE	DUCED ONCE T	THE ZEROS A	ARE FIT BY '	THE OTHER P	ART OF THE MODEL
Bhyper BY hyper@1;	! Separate	hyper usin	g latent va	riable "Bhyper"	Dispersio	n				
hyper@0 Bhyper*;	! Level-2 r	andom inte	rcept varia	nce is now Bhyper	PERP		0.264	0.219	1.204	0.229
[hyper@0 Bhyper*];	! Fixed int	ercept is	now from Bh	yper						
perp*: ! Level-2 random intercept variance for amount			Between L	evel						
perp#1*: ! Level-2 random intercept variance for if 0										
[perp*]: Fixed intercept for amount			INTERCEPT	VARIANCE IN	HYPER HAS	S BEEN 'MOV	ED' TO BHYP	ER TO TRICK MPLUS		
[perp#1*1: ! Fixed intercept for if 0			BHYPER	BY						
perp ON Bhyper*: ! Level-2 relationship for amount				HYPER		1 000	0 000	999 000	999 000	
perp of Dryper, : Level 2 relationship for if 0			1111 111	-	1.000	0.000	555.000	555.000		
Number of Free Dars	: Hever 2 1	eracronsni	12		AMONG HTT	-	ENCINC MOL	סד מעסדס המ	AN OTHERS O	N AVERACE ACROSS
Loglikolihood	ameters		12		DAVE DOFE	NOT DEFERI	TOC COUNT	L OF TRY CO	MEONE DEDDO	ON AVERAGE ACROSS
LOGIIKEIIII000			060 022		DEDD	ON ON	LIGG COON	1 01 110 50	MEONE FERES	ON AVERAGE
HU Value	a Commontion	Fastom	-000.032		PERP		0 264	0 471	0 561	0 574
HU SCAIII	Ig Correction	Factor	2.24/		BRIPE	IK.	0.204	0.4/1	0.501	0.574
Tof ML	ς -				EVDEDTENC	TNO NODE UVE				A DAVA DODA NOT
Information Criter	La		1945 664		EXPERIENC	ING MORE HIP	PER THAN OF	THERS ON AV	ERAGE ACROS	S DAIS DOES NOT
Akaike (A	ALC)		1/45.004		PREDICT L	OGIT OF NOT	HITTING			
Bayesian	(BIC)	5.7.0	1805.245		PERP#1	ON	0 5 0 5	0 054	0 616	0 500
Sample-Si	Lze Adjusted	BIG	1767.131		BHYPE	IR	-0.527	0.854	-0.616	0.538
(n* =	(n + 2) / 24)									
					FIXED INT	ERCEPT FOR H	IYPER HAS I	BEEN 'MOVED	' TO BHYPER	TO TRICK MPLUS
RANDOM INTERCEPT VA	ARIANCE (NOTH	ING PREDIC	TING HYPER)		Means					
Variances					BHYPE	IR	0.035	0.056	0.620	0.535
BHYPER	0.115	0.025	4.661	0.000						
					FIXED INT	ERCEPT (COND	DITIONAL ON	N HYPER: IS	LOG COUNT	OR LOGIT OF IPV
RANDOM INTERCEPT LE	EFT OVER VARI	ANCE (PERP	IS PREDICT	ED BY HYPER)	PERPETRAT	ED BY SOMEON	IE AVERAGE	ON HYPER A	CROSS DAYS)	
Residual Variances					Intercept	s				
HYPER	0.000	0.000	999.000	999.000	HYPER	1	0.000	0.000	999.000	999.000
PERP#1	1.856	0.720	2.579	0.010	PERP#	1	2.006	0.274	7.335	0.000
PERP	0.241	0.134	1.801	0.072	PERP		0.385	0.169	2.274	0.023

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Model 5: Two-Part Distribution Model (with log transform for continuous part)

TITLE: Model 5: Two-Part Distributions (1 vs. something - "if and	MODEL RESULTS					
how much", log amount predicted as continuous)	Two-Tailed					
DATA: FILE IS MPlusData.csv;	Estimate S.E. Est./S.E. P-Value					
DATA TWOPART: ! Instructs Mplus to cut up each into 0/log of amount	Within Level					
NAMES ARE perp;	IF PERSON PERPETRATES, HYPER MORE THAN USUAL DOES NOT PREDICT LOG					
BINARY ARE BDETD:	AMOINT OF HOW MICH TRY THEY PERP THAT DAY					
CONTINUOUS ARE CDEPD;	CPERP ON					
CUTPOINT IS 0:	HYPER 0.124 0.097 1.281 0.200					
TRANSFORM IS LOG: 'Could also use "NONE" for no transformation						
VARIABLE: NAMES ARE ID hyper alc perp perpr:	TE HIGHER ON HYPER THAN USUAL. MORE LIKELY TO HIT (OPPOSITE OF NBH)					
USEVARIABLES ARE hyper Brern Chern.	TO THE OF HITTER INCOMENTATION OF A DEP INTER MORE HITTER OF A DEP THAN ISHAT					
CATECORICAL ARE BROKEN.	DOGIT OF MITTING INCREASES DI 1.5 FER ONTI MORE MITER MAR OSOAL					
MISSING ADF ALL (_00) -						
CINERED IE ID.	11FER 1.552 0.450 5.557 0.000					
CLUSTER IS J.						
ANALYSES. CENTER HYPEL (GRANDHEAN),	Variance (Nothing Fredicting Hifek)					
MODEL: ESTIMATOR IS MLR; TIPE = TWOLEVEL RANDOM;						
NODEL:	HIPER 0.132 0.024 5.577 0.000					
hyper* Cperp*; ! Level-1 residual Variance for both	RESIDUAL LEFT OVER VARIANCE (PERP IS PREDICTED BY HYPER)					
Cperp ON nyper*; ! Level-1 relationship for amount	Residual Variances					
Bperp ON nyper*; ! Level-1 relationship for is NOT 0?	CPERP 0.274 0.040 6.797 0.000					
SBETWEENS	Between Level					
Bhyper BY hyper(1; ! Separate hyper using latent variable "Bhyper"						
hyper(0 Bhyper*; ! Level-2 random intercept variance is now Bhyper	INTERCEPT VARIANCE IN HYPER HAS BEEN 'MOVED' TO BHYPER TO TRICK MPLUS					
[hyper(0 Bhyper*]; ! Fixed intercept is now from Bhyper	BHYPER BY					
Cperp*; ! Level-2 random intercept variance for amount	HYPER 1.000 0.000 999.000 999.000					
Bperp*; ! Level-2 random intercept variance for if NOT 0						
[Cperp*]; ! Fixed intercept for amount	AMONG HITTERS, EXPERIENCING MORE HYPER THAN OTHERS ON AVERAGE ACROSS					
[Bperp\$1*]; ! Fixed threshold for if NOT 0	DAYS DOES NOT PREDICT LOG AMOUNT OF IPV SOMEONE PERPS ON AVERAGE					
Cperp ON Bhyper*; ! Level-2 relationship for amount	CPERP ON					
Bperp ON Bhyper*; ! Level-2 relationship for if NOT 0	BHYPER 0.065 0.263 0.249 0.804					
Number of Free Parameters 12						
Loglikelihood	EXPERIENCING MORE HYPER THAN OTHERS ON AVERAGE ACROSS DAYS DOES NOT					
H0 Value -794.694	PREDICT LOGIT OF HITTING					
H0 Scaling Correction Factor 2.246	BPERP ON					
for MLR	BHYPER 0.493 0.859 0.574 0.566					
Information Criteria						
Akaike (AIC) 1613.388	FIXED INTERCEPT FOR HYPER HAS BEEN 'MOVED' TO BHYPER TO TRICK MPLUS					
Bayesian (BIC) 1672.969	Means					
Sample-Size Adjusted BIC 1634.855	BHYPER 0.034 0.056 0.609 0.543					
$(n^* = (n + 2) / 24)$						
	FIXED INTERCEPT (CONDITIONAL ON HYPER: IS LOG AMOUNT OF IPV PERPETRATED					
RANDOM INTERCEPT VARIANCE (NOTHING PREDICTING HYPER)	BY SOMEONE AVERAGE ON HYPER ACROSS DAYS)					
Variances	Intercepts					
BHYPER 0.114 0.025 4.652 0.000	HYPER 0.000 0.000 999.000 999.000					
RANDOM INTERCEPT LEFT OVER VARIANCE (PERP IS PREDICTED BY HYPER)	CPERP 0.608 0.075 8.077 0.000					
Residual Variances	FIXED INTERCEPT (CONDITIONAL ON HYPER: IS LOGIT OF NOT HITTING FOR					
BPERP 1.860 0.720 2.583 0.010	SOMEONE AVERAGE ON HYPER ACROSS DAYS)					
HYPER 0.000 0.000 999.000 999.000	Thresholds					
CPERP 0.099 0.047 2.108 0.035	BPERP\$1 2.006 0.274 7.331 0.000					

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So which model should we choose to interpret?

Unfortunately, absolute model fit statistics are not given for the non-normal models, and relative fit statistics (AIC and BIC) are not comparable across the normal, Poisson/NB/NBH, and two-part families. What we can do is examine the predicted item responses for each alternative model and see what seems reasonable. Here is the plot (made in excel) for showing the predicted amount of IPV for ±2SD of within-person hyperarousal.

The WP effect of hyperarousal predicting amount of IPV is significant according to the normal, Poisson, and Negative Binomial models. As we can see, the normal model predicts a significant linear relationship, which will eventually extend below 0, whereas those relationships predicted by the Poisson and Negative Binomial models "shut off" as the predicted count approaches 0 (because of the log link transformation—that is its purpose).

In contrast, both "if and how much" type models—the Negative Binomial Hurdle and the Two-Part Log—have expected counts that do not approach 0, because that zero-inflated aspect of the data is modeled as a separate outcome instead. So after dividing the outcome into"0 vs. something", these two models suggest there is no WP relationship for "something". In contrast, there is a significant WP relationship for the "if" part (not shown in figure).

