


Supplementary Material S1. Symptom diary

4 Symptoms

Each day, please complete the 6 symptom boxes using the number which you think **best shows how your child has been over the last 24 hours**

0 = Normal
1 = Very little problem
2 = Slight problem
3 = Moderately bad
4 = Bad
5 = Very bad
6 = As bad as it could be


 Your child's study number:
999999

This column is for the day your child saw the doctor or nurse

	Saw doctor or nurse	Week 1 (days 1 to 7)							Week 2 (days 8 to 14)							Week 3 (days 15 to 21)							Week 4 (days 22 to 28)						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28
Fill in the day of the week (for example M, T, W, T, F, S, S)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
How was your child's cough?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
How short of breath (breathing faster) was your child?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
How well did your child sleep (last night)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
How well did your child cope with normal activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
How unwell was your child?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
How was your child's temperature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Medicines

If your child has been taking any medicines please write in the name of the medicine and the number of times, per day, your child took each medicine in the table below

Write the medicine name here

	Saw doctor or nurse	Week 1 (days 1 to 7)							Week 2 (days 8 to 14)							Week 3 (days 15 to 21)							Week 4 (days 22 to 28)						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28
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<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Supplementary Material S2. Case report form

CASE REPORT FORM

ID
Today's date
DD / MM / 20YY
 Informed consent for study obtained

Background information
DOB DD / MM / YYYY
Gender Female₀ Male₁ Ethnicity
PTO for codes, if other ethnicity, please describe below

Mother's age # children in home (inc. unwell child)
Does the mother smoke? No₀ Yes₁ Don't know₈₈
Mother still breast feeding child at 3 months? No₀ Yes₁ Don't know₈₈

Carer reported symptoms

How unwell does the parent consider the child to be? Well 0 1 2 3 4 5 6 7 8 9 10 Very unwell

Duration of illness days Has illness got a lot worse recently? No₀ Yes₁ If Yes, how many days ago did it start to get worse? days

Symptoms present	During illness?			Last 24 hours?			Severity in last 24 hours (tick one)		
	No ₀	Yes ₁	If yes	No ₀	Yes ₁	If yes	Mild ₁	Moderate ₂	Severe ₃
Dry cough	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Productive/ wet cough	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Barking/ croupy cough	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blocked or runny nose	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change in cry	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breathing faster than normal (shortness of breath)	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wheeze or whistling in the chest	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fever	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chills/ shivering	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diarrhoea	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vomiting (including after cough)	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking fewer fluids/ milk feeds	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eating less	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low energy/ fatigue/ lethargy	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disturbed sleep	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Passing urine less often/ dryer nappies	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<small>Please tick NA if the child is too young/ uncommunicative for the parent to know about the following > NA <input type="checkbox"/></small>									
Chest/ shoulder pain	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headache	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Muscle aches all over	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confusion/ disorientation	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clinician examination and management

Temperature °C Pulse bpm

Pallor Absent₀ Present₁ Respiratory rate bpm O₂ sat % Unable to take O₂ sat/no equipment

Nasal flaring Consciousness level normal₀ irritable₁ drowsy₂

Stridor Capillary refill time 2 seconds or less₀ 3 seconds or more₁

Inter/ subcostal recession Inflamed pharynx/ tonsils

Wheeze Absent₀ Unilateral₁ Bilateral₂

Crackles/ crepitations

Bronchial breathing

How unwell do you consider the child to be? Well 0 1 2 3 4 5 6 7 8 9 10 Very unwell

Throat swab taken? No₀ Yes₁

If No, reason:
 Child refusal₁
 Parent refusal₂
 Other (specify)₃

Main working respiratory tract diagnosis

My gut feeling is 'something is wrong' No₀ Yes₁

Antibiotics prescribed? No₀ Yes, immediate₁ Yes, delayed₂ by days

Referral for acute admission today? No₀ Yes₁

Supplementary material S3. LLCA models – model fit and comparisons.

Table. Fit statistics for “cough” models (n = 1,408)

Timing	# classes	# parameters	aBIC	Entropy	Smallest class	LL	Δ LL	LMR pvalue	BLRT pvalue
1-15 days (skip 0)	1	30	26845.6	NA	100.0%	13361.7		-	-
	2	61	21064.5	0.942	25.9%	10408.0	2953.6	< 0.001	< 0.001
	3	92	19142.9	0.915	16.6%	9384.1	1024.0	< 0.001	< 0.001
	4	123	18513.5	0.932	7.2%	9006.3	377.8	< 0.001	< 0.001
	5	154	17920.7	0.930	6.8%	8646.7	359.5	< 0.001	< 0.001
	6	185	17570.4	0.932	5.7%	8408.4	238.3	< 0.001	< 0.001
	7	216	17290.6	0.932	5.1%	8205.4	203.0	0.0035	0.0040
1-15 days (skip 1)	1	16	14247.7	NA	100.0%	7091.3		-	-
	2	33	11896.6	0.903	22.8%	5881.1	1210.2	< 0.001	< 0.001
	3	50	11288.3	0.843	14.8%	5542.3	338.8	< 0.001	< 0.001
	4	67	11070.3	0.867	6.6%	5398.7	143.6	< 0.001	< 0.001
	5	84	10925.4	0.900	6.0%	5291.6	107.1	< 0.001	< 0.001
	6	101	10875.9	0.900	2.5%	5232.2	59.4	0.0115	< 0.001
	7	118	10826.6	0.920	2.2%	5173.0	59.2	1.0000	< 0.001
1-15 days (skip 2)	1	10	8765.9	NA	100.0%	4362.6		-	-
	2	21	7928.3	0.820	24.0%	3921.4	441.2	< 0.001	< 0.001
	3	32	7766.7	0.742	13.0%	3818.2	103.2	< 0.001	< 0.001
	4	43	7711.0	0.805	9.4%	3767.9	50.3	0.0045	< 0.001
	5	54	7695.1	0.817	2.0%	3737.6	30.4	0.0513	< 0.001
	6	65	7700.1	0.833	1.5%	3717.7	19.9	0.0166	0.3960

LL= log-likelihood, Δ LL= change in log-likelihood, aBIC = Sample-size adjusted BIC;
BLRT = Bootstrap Likelihood Ratio Test; LMR = Lo-Mendell Rubin test

Model fit statistics considered

aBIC - sample-size adjusted Bayesian Information Criterion.

The Bayesian Information Criterion (BIC: Schwartz, G., 1978) is the most commonly-used fit statistic for comparing mixture models. A function of both the likelihood and the number of estimated parameters, the BIC penalises model complexity. We opted for the sample-size adjusted version which incorporates the sample-size as an additional term. BIC will typically decrease and then increase following the incremental additional of classes. Using this statistic the model with the lowest BIC (or other models with BIC values in the vicinity) would be deemed satisfactory however in some instances this statistic did not reach a minimum within the range of models considered..

Bootstrap tests for nested models.

The Bootstrap Likelihood Ratio Test (BLRT) and the Lo-Mendell-Rubin (LMR) test statistics (Nylund et al., 2007) both assess change in model fit when adding an additional class. Here a high p-value for a k-class model indicates no substantial improvement in fit compared to the k-1 class solution. Unlike the LMR, The BLRT makes no distributional assumptions and simulation work has so far shown this measure to be superior (Nylund et al., 2007) however in our experience the BLRT can be extremely conservative and may reject all the models considered.

Entropy.

Mixture modelling output consists primarily of class-assignment probabilities which describe the confidence with which each participant can be assigned to each latent class. Entropy, also referred to as classification accuracy, summarises this information as a single measure which can take values from zero to one, with one indicating no assignment uncertainty. Entropy is of little use in determining the optimal model (Tein et al, 2013) and can be poor in simulation studies even when the correct model is estimated (Heron et al., 2015). Whilst LCA has been promoted as a method to facilitate targeted interventions (Lanza and Rhoades, 2013) we propose that such a strategy is dependent on clearly defined and well-separated groups of individuals. Consequently, we regard entropy as an indicator of model *utility* since if entropy is low and individuals can only be poorly classified then the resulting classification is of little use as a targeting tool.

In addition, entropy has been shown to be important when it comes to the level of bias resulting from a standard three-step analysis (Vermunt, 2010; Bakk, Tekle, & Vermunt, 2013; Bakk, Oberski, & Vermunt, 2014). Whilst not directly related to the issue of model utility, entropy will influence the analytical approach employed when assessing covariate and outcome associations.

Smallest class size.

As a latent class analysis is usually the initial stage of a project with the intention of deriving a number of groups for further research, analysts often place a limit on the size of the results classes. This pragmatic decision is to facilitate the planned further study since there is little one could reasonably do with a class of ten participants other than drop them from the sample. Here we only considered models where all classes contained at least 5% of the participants.

Bivariate residuals

In addition to the figures shown in the previous table we also examined the bivariate residuals from each model. Mixture modelling, as with continuous trait modelling, is based on the assumption of conditional independence, namely that the class indicators should be independent conditional on the latent variable. The pattern and magnitude of these residuals is examined over the following few pages.

Bakk, Z., Tekle, F. T., & Vermunt, J. K. (2013). Estimating the association between latent class membership and external variables using bias-adjusted three-step approaches. *Sociological Methodology*, 43, 272-311.

Bakk, Z., Oberski, D. L., & Vermunt, J. K. (2014). Relating Latent Class Assignments to External Variables: Standard Errors for Correct Inference. *Political Analysis*, 22, 520-540.

Heron, J. E., Croudace, T. J., Barker, E. D., & Tilling, K. (2015). A comparison of approaches for assessing covariate effects in latent class analysis. *Longitudinal and Life Course Studies*; Vol 6, No 4.

Lanza ST and Rhoades BL. Latent Class Analysis: An Alternative Perspective on Subgroup Analysis in Prevention and Treatment. *Prevention Science*. 2013, Volume 14, Issue 2, pp 157-168

Nylund KL, Asparouhov T, Muthen BO. Deciding on the Number of Classes in Latent Class Analysis and Growth Mixture Modelling: A Monte Carlo Simulation Study. *Structural Equation Modelling: A Multidisciplinary Journal* 2007;14(4):535-569.

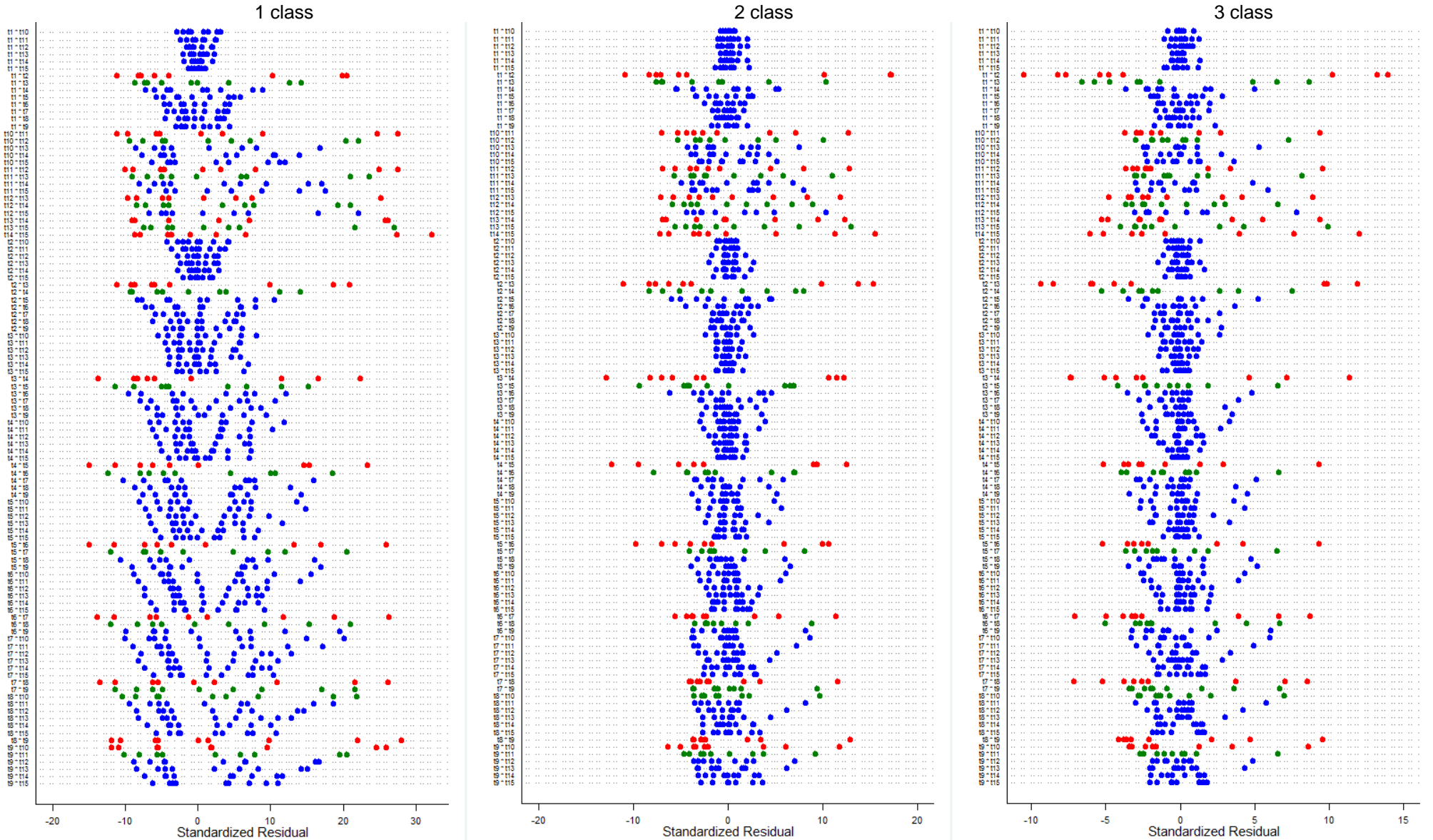
Schwarz G. Estimating the dimension of a model. *Annals of Statistics* 1978;6:461–464

Tein J-Y, Coxe S, Cham H. Statistical Power to Detect the Correct Number of Classes in Latent Profile Analysis. *Structural Equation Modeling: A Multidisciplinary Journal*. Vol. 20, Iss. 4, 2013.

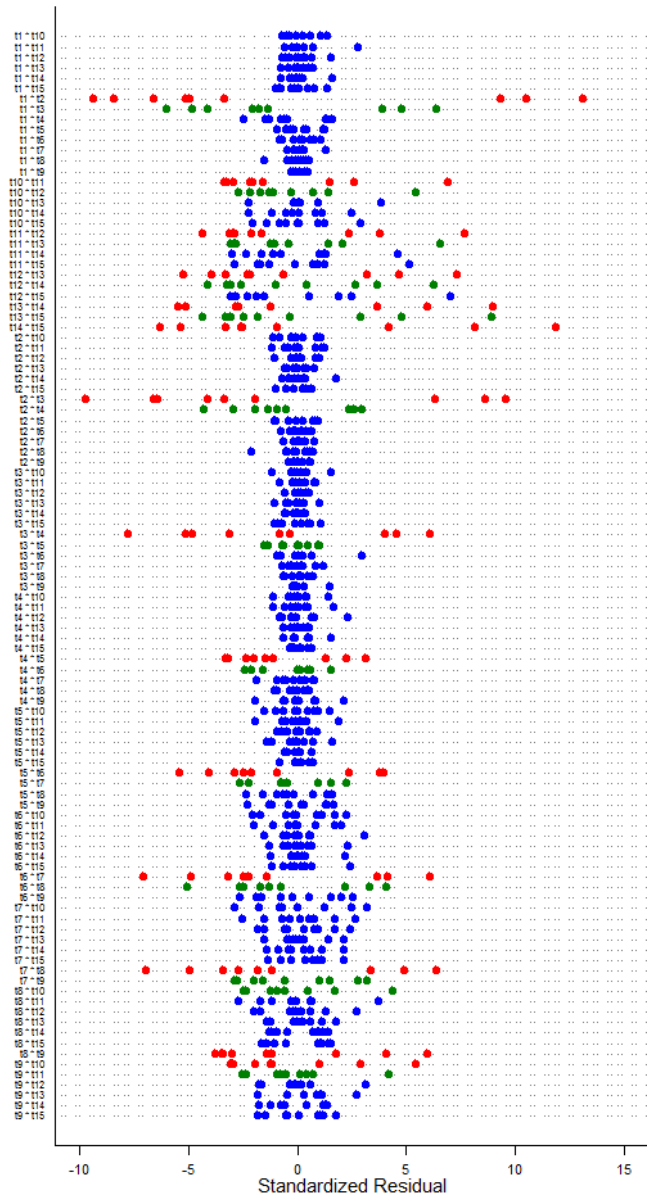
Vermunt, J. K. (2010). Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis*, 18, 450-469.

Bivariate residuals from models of 15 consecutive days' data on COUGH.

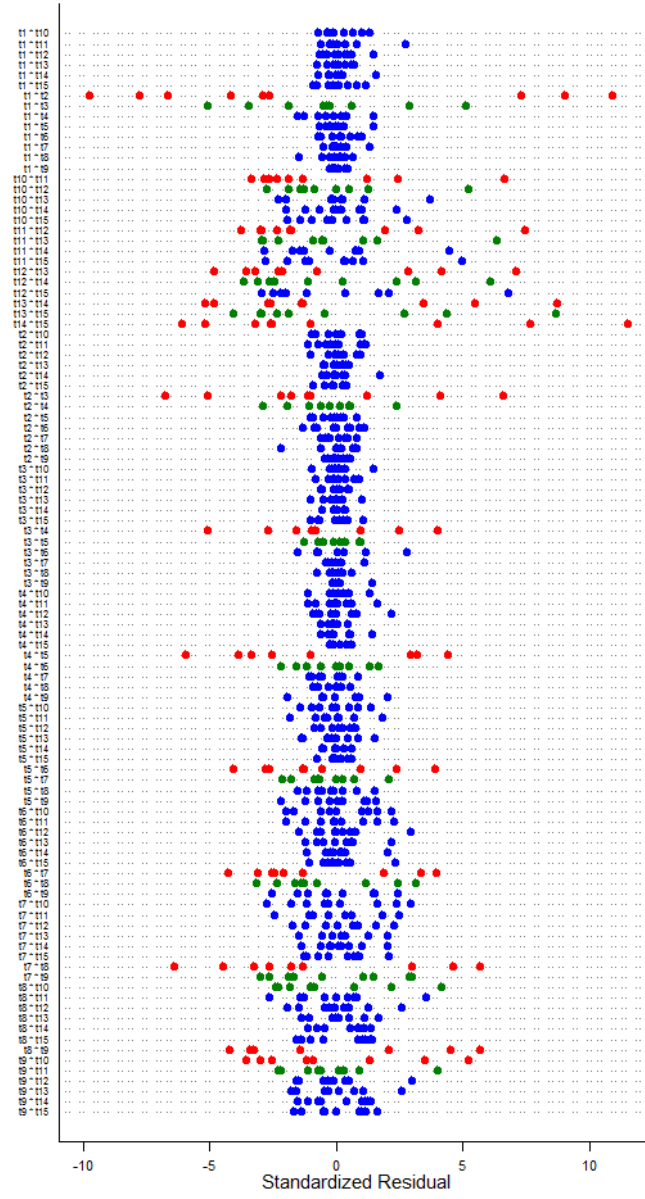
Graphs over next two pages show residuals for 1 class, 2 class, ... 6 class models. As each class indicator has three categories, there are nine residuals for each pair of measures (3x3 cells in the contingency table). Red indicates residuals between adjacent time points, green indicates residuals between measures two days apart and blue the remaining residuals. It's apparent that these models are failing to capture two aspects of the data (i) the strong association between measures taken very close together and (ii) the association between measures taken towards the start and end of the two-week period when the majority of children exhibit little change from day to day.



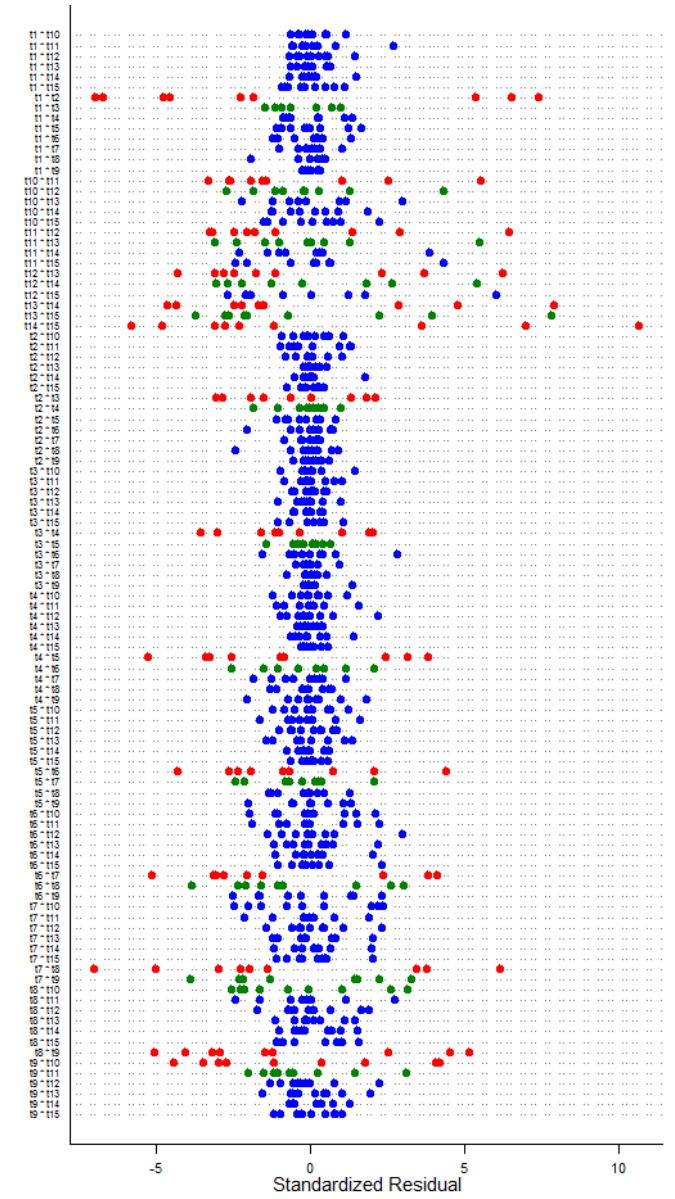
4 class



5 class

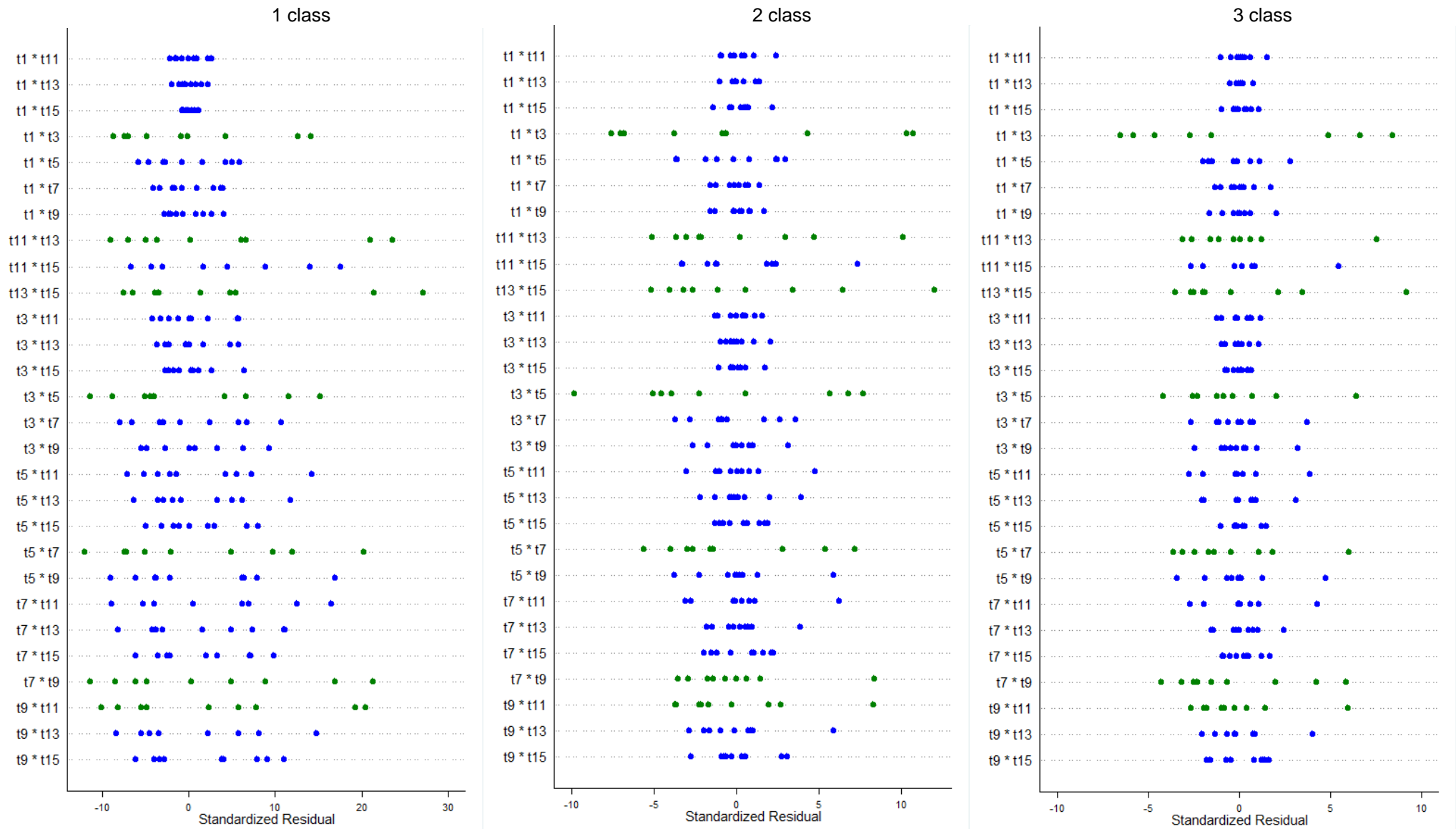


6 class

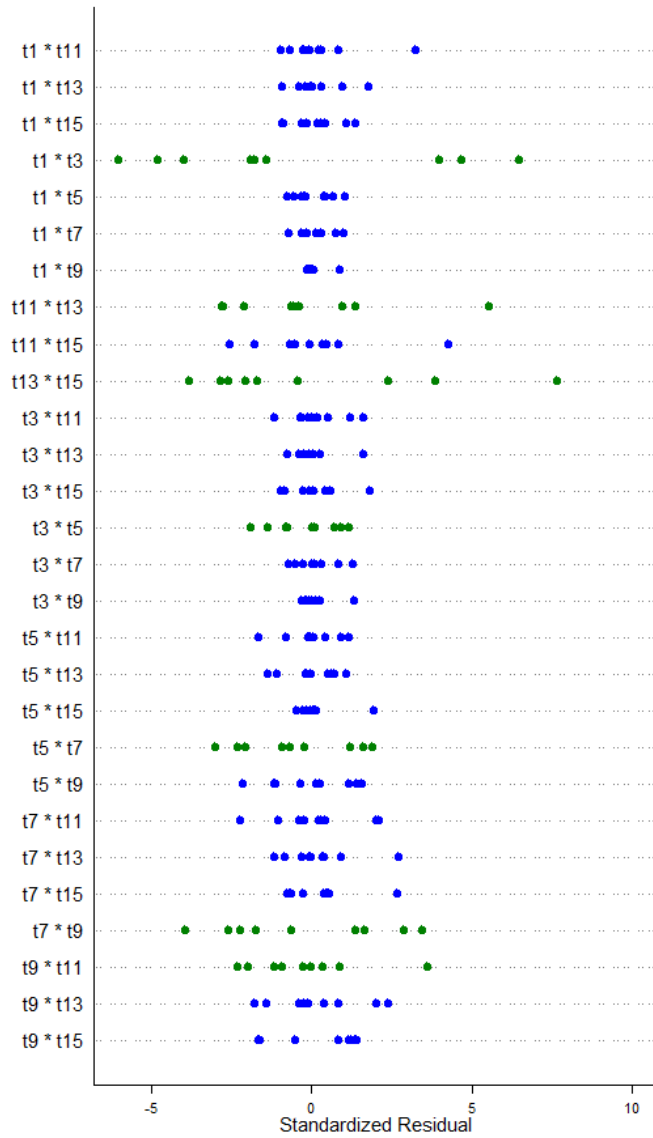


Bivariate residuals from models of 8 measures taken from alternate days' data on COUGH.

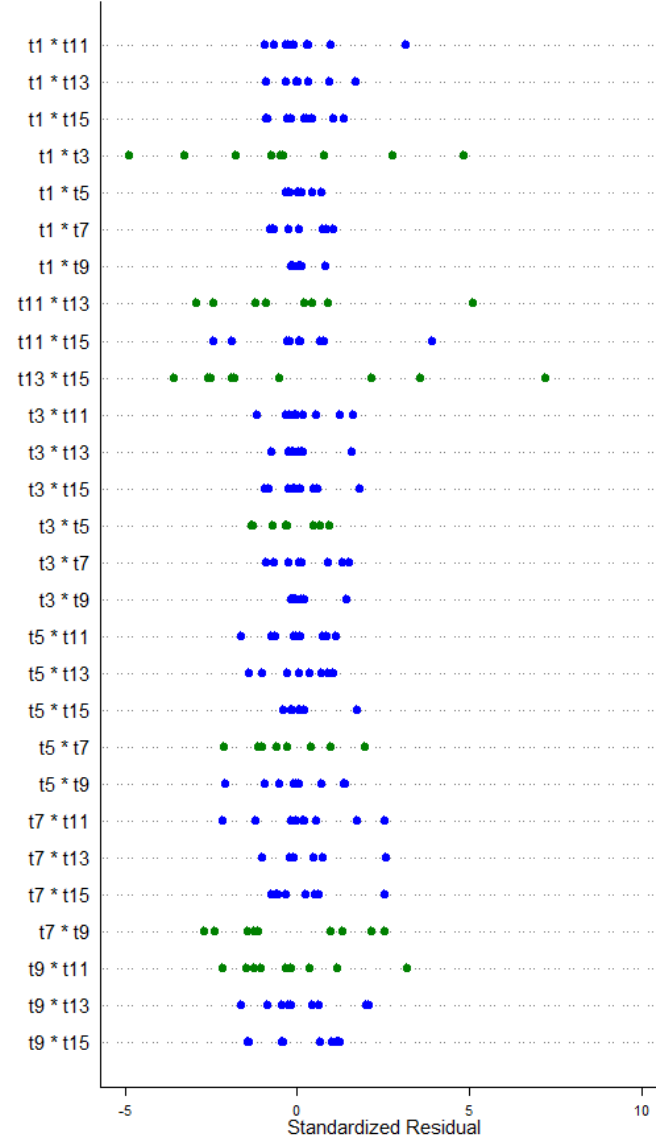
Not surprisingly, we see marked improvement in the magnitude of the residuals when adjacent measurements are dropped from the model. These figures show pairwise residuals from 1 through 6-class models for the cough data using alternate measures. Once again, but to a lesser extent, we see that the model is less able to model the data at the two extremes of the two-week measurement window.



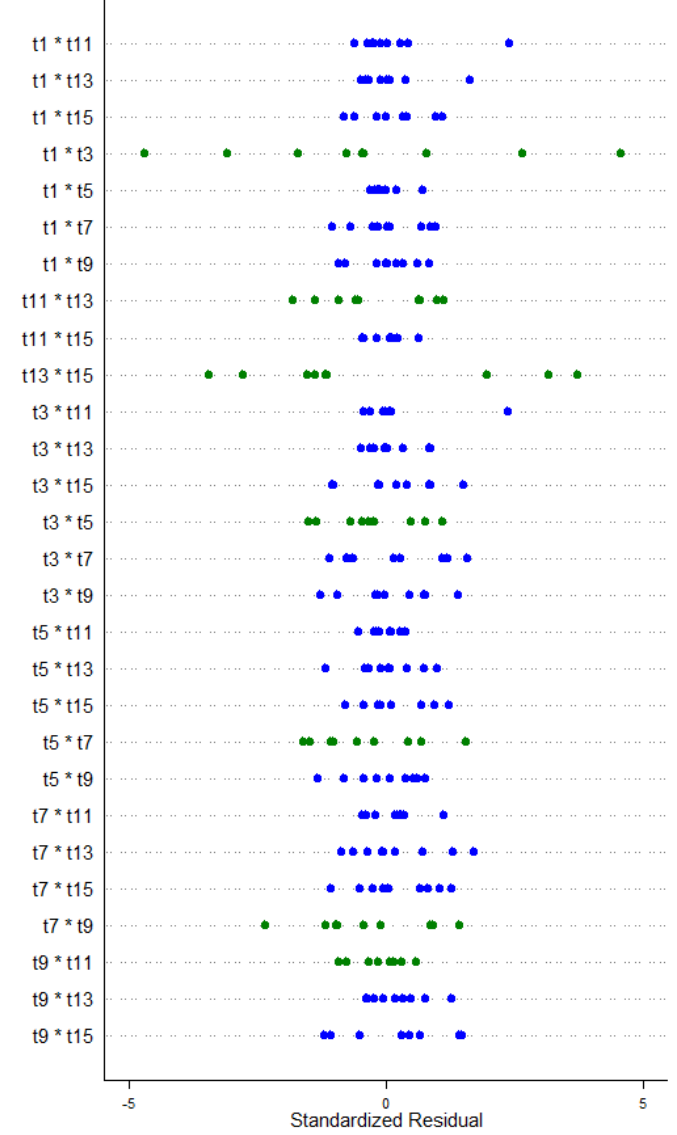
4 class



5 class

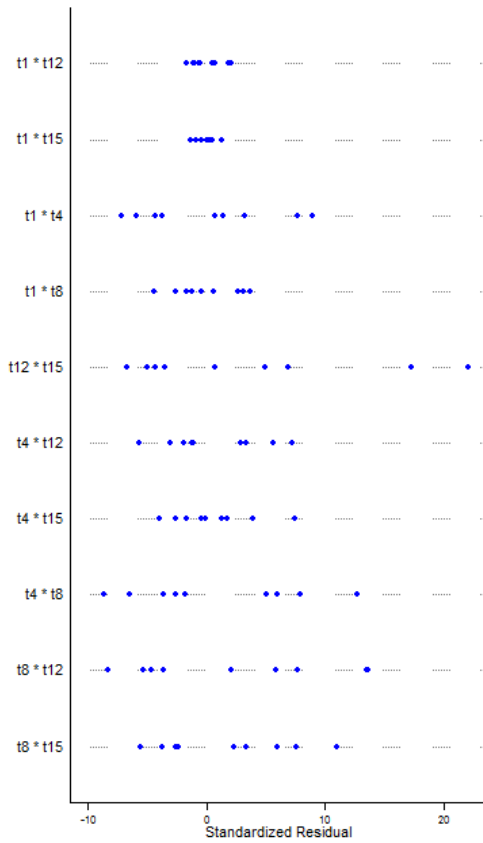


6 class

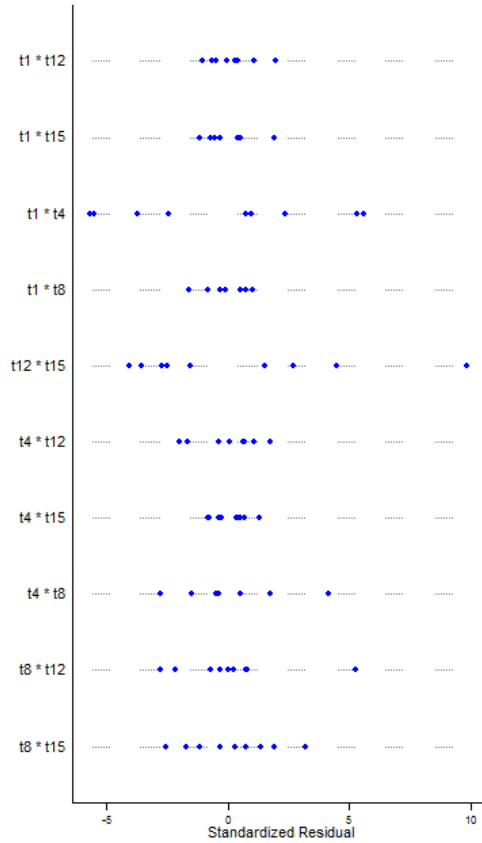


Bivariate residuals from models of 5 measures of COUGH taken from the 15 days of information.

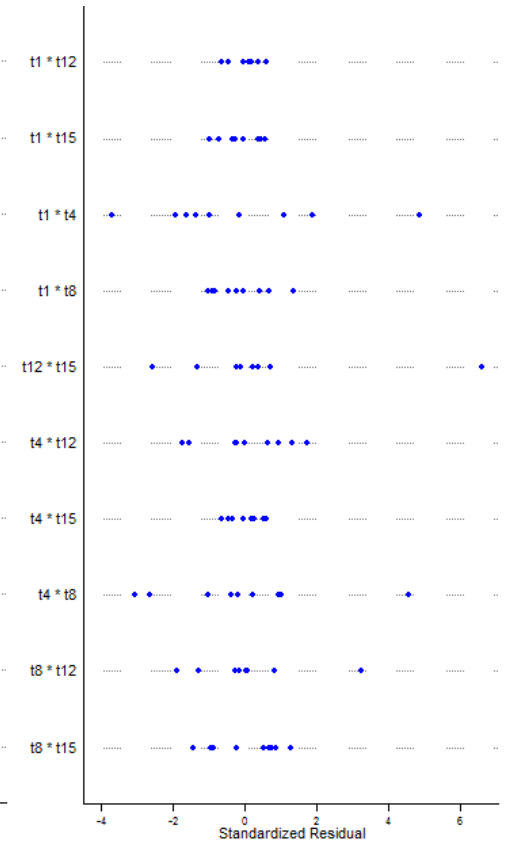
1 class



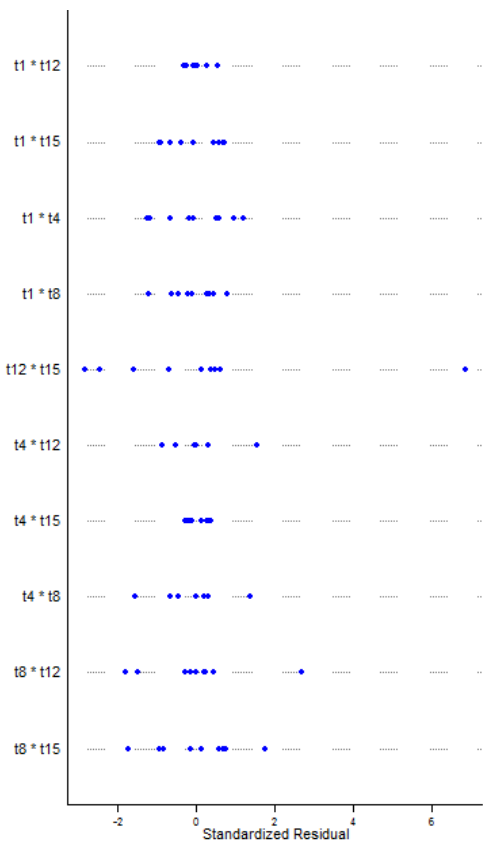
2 class



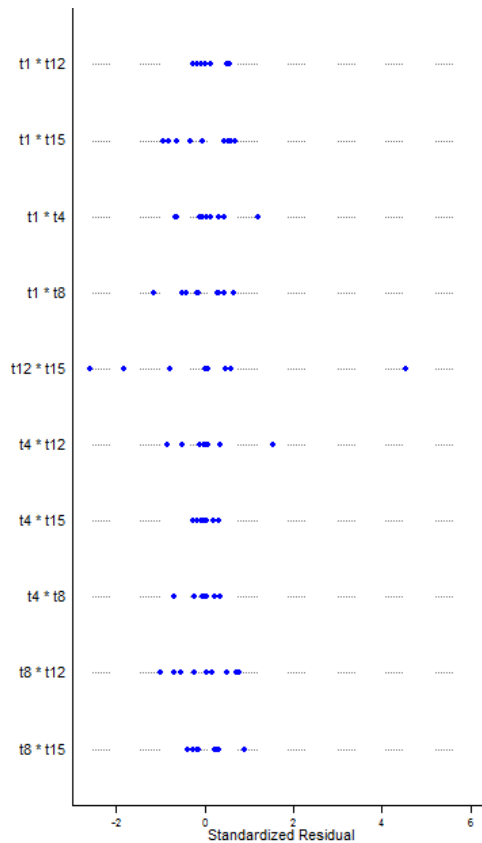
3 class



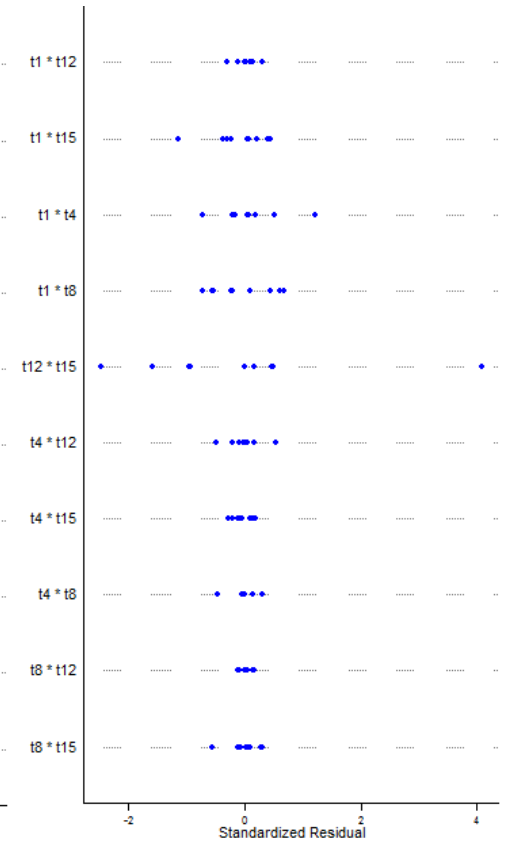
4 class



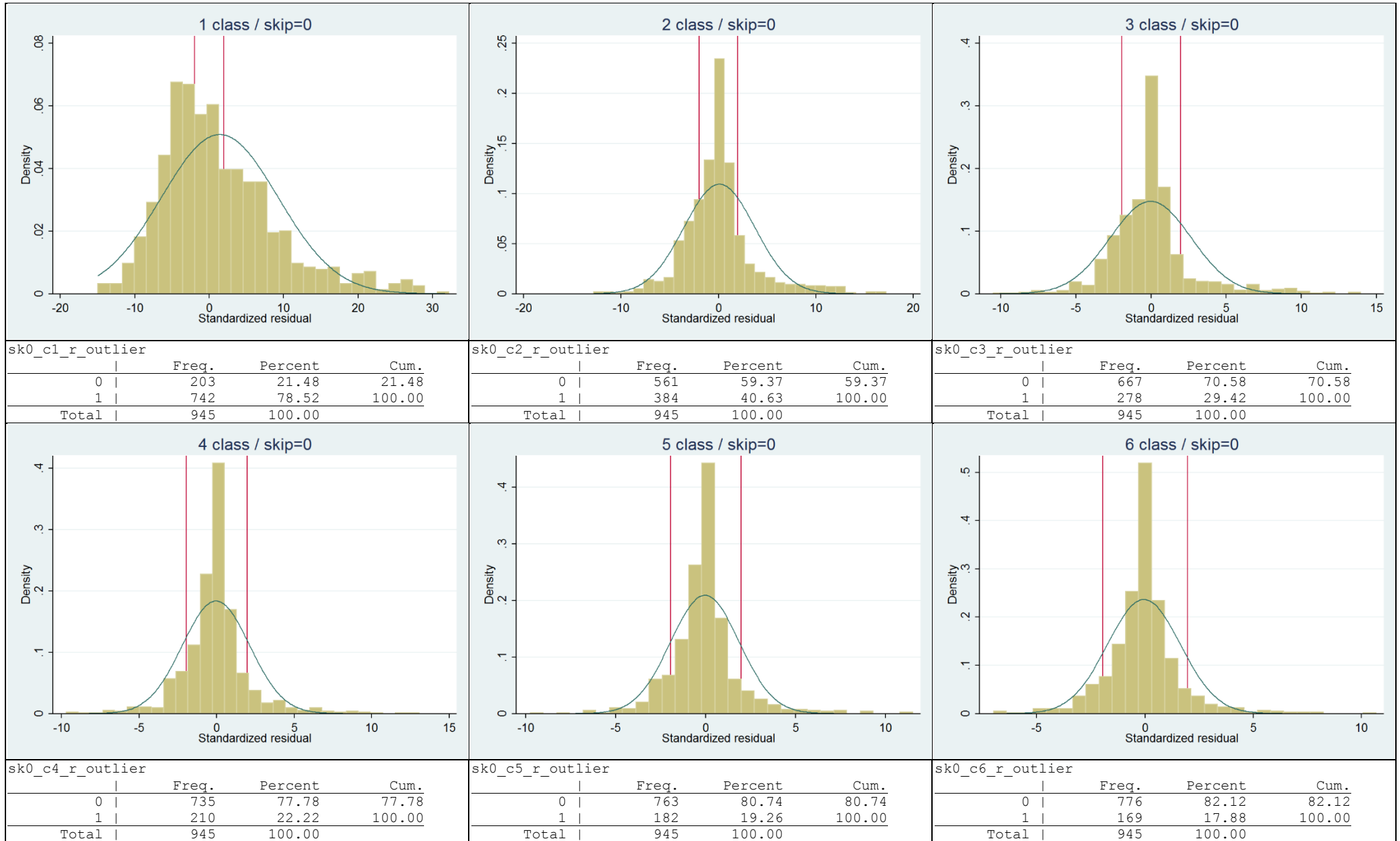
5 class



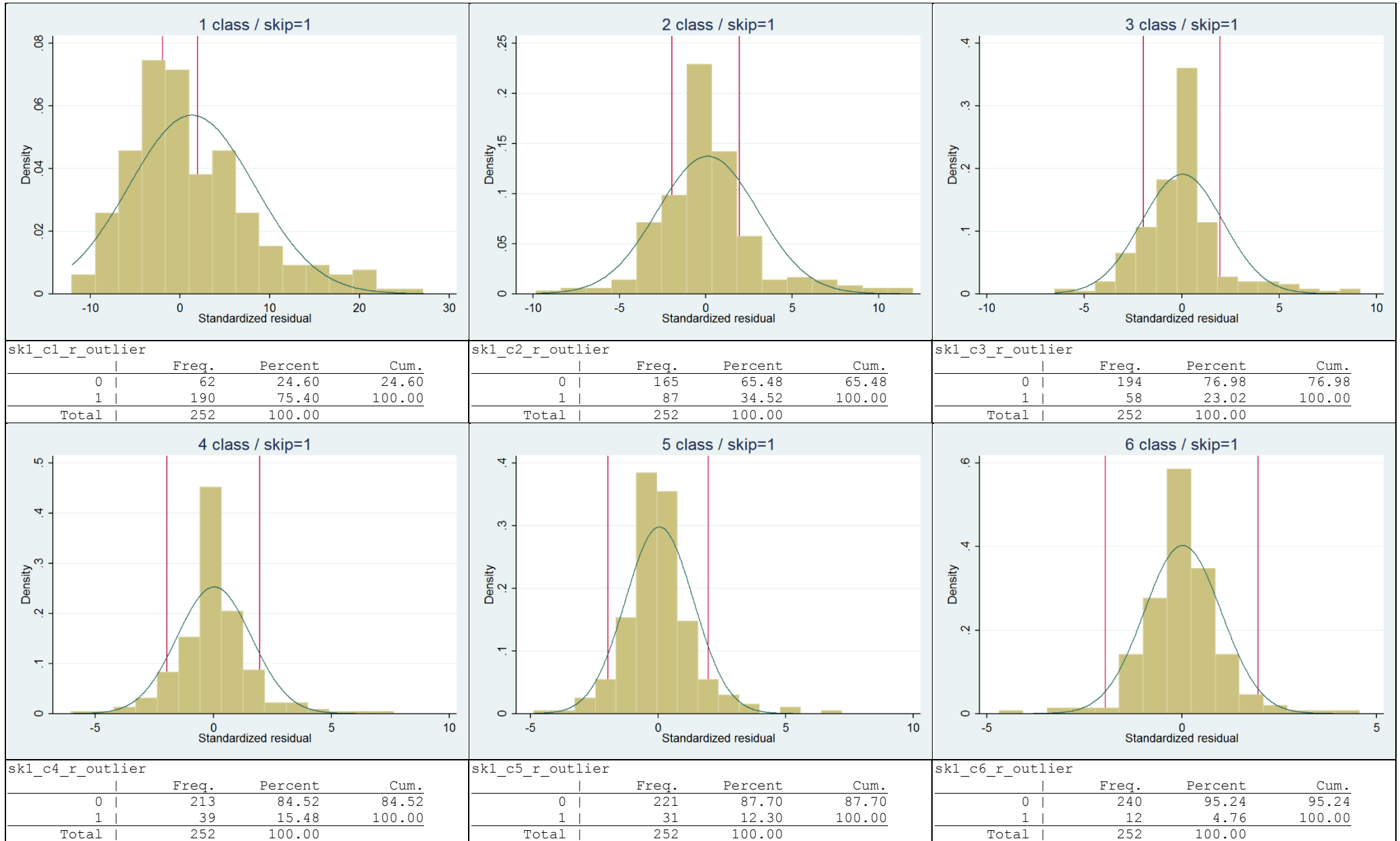
6 class



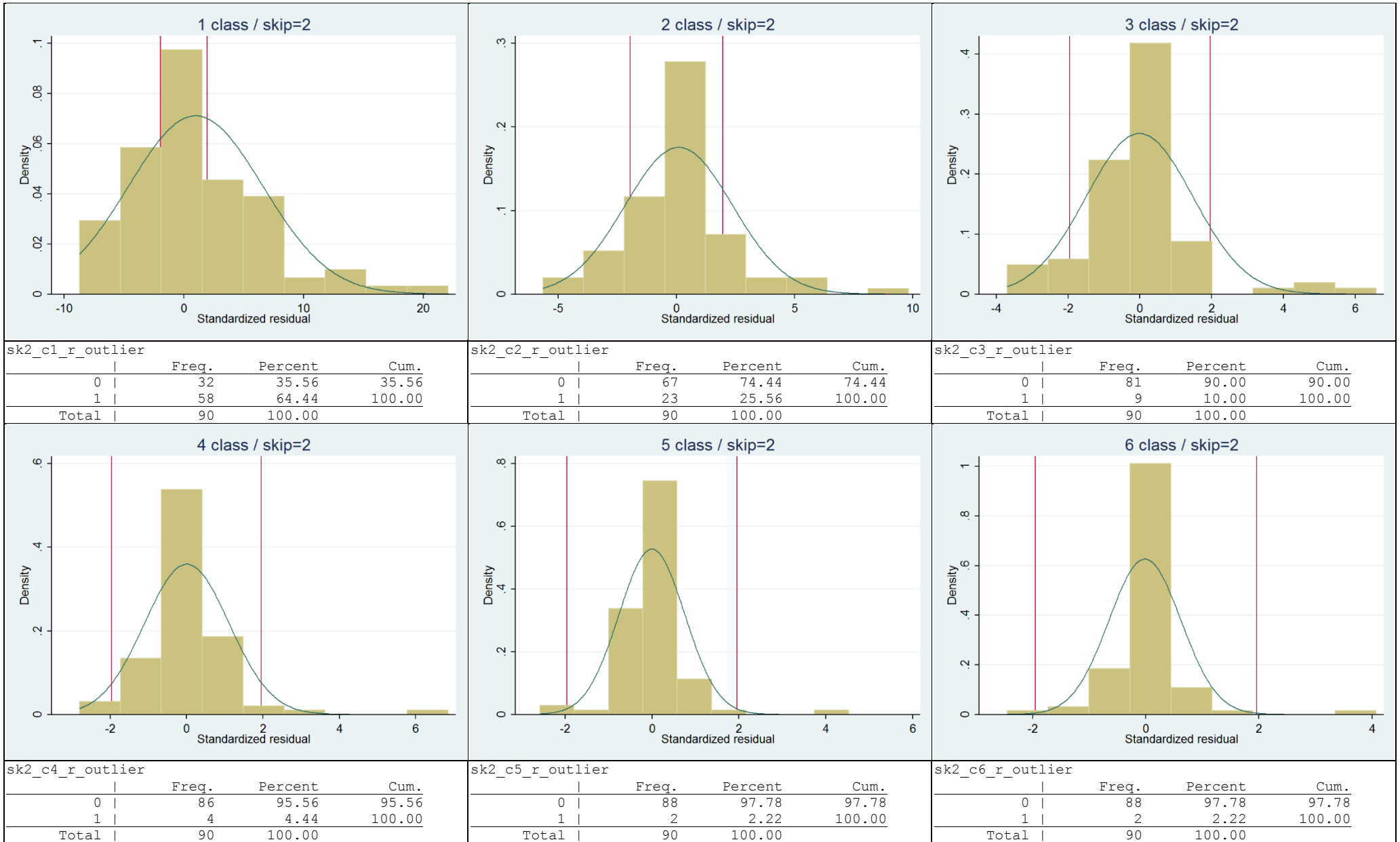
Distribution of bivariate residuals with red-lines indicating +/- 1.96 (Skip 0: All 15 measures)



Distribution of bivariate residuals with red-lines indicating +/- 1.96 (Skip 1: Alternate measures)



Distribution of bivariate residuals with red-lines indicating +/- 1.96 (Skip 2: Every third measure)

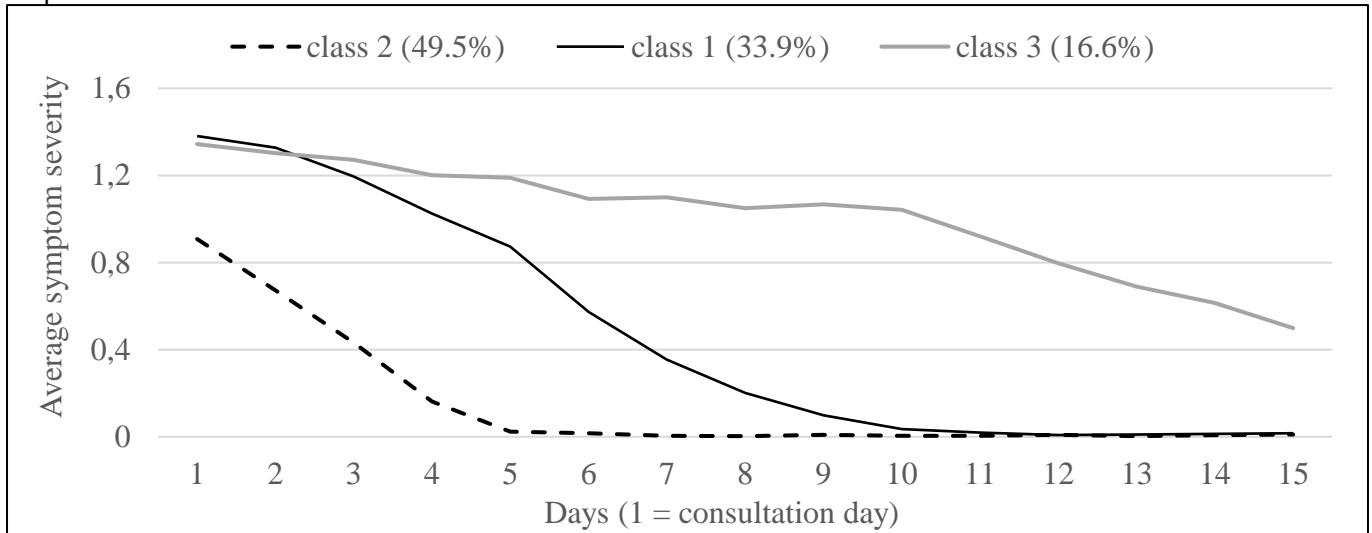


Estimated trajectories

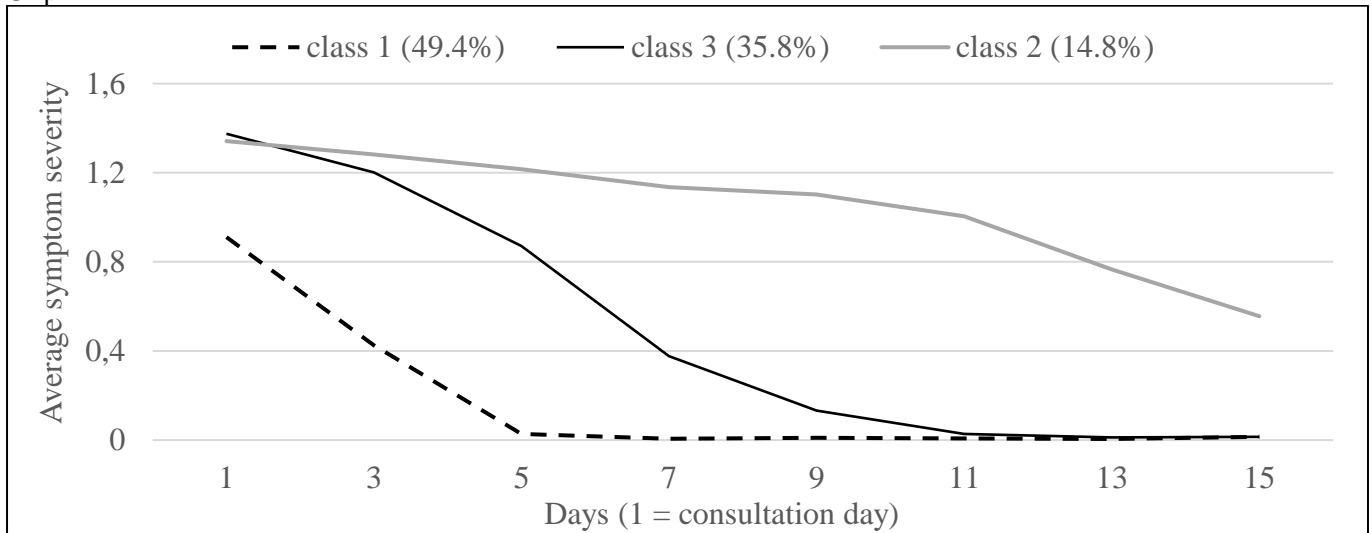
Modelling three-category ordinal measures poses a slight problem when it comes to plotting the results as all three categories describe a trajectory through time meaning two plots are necessary. To avoid this we have collapsed the within-class profiles by turning the probabilities into a single measure of severity (severity = $0 \cdot P(\text{Category } 0) + 1 \cdot P(\text{Category } 1) + 2 \cdot P(\text{Category } 2)$).

3-class models

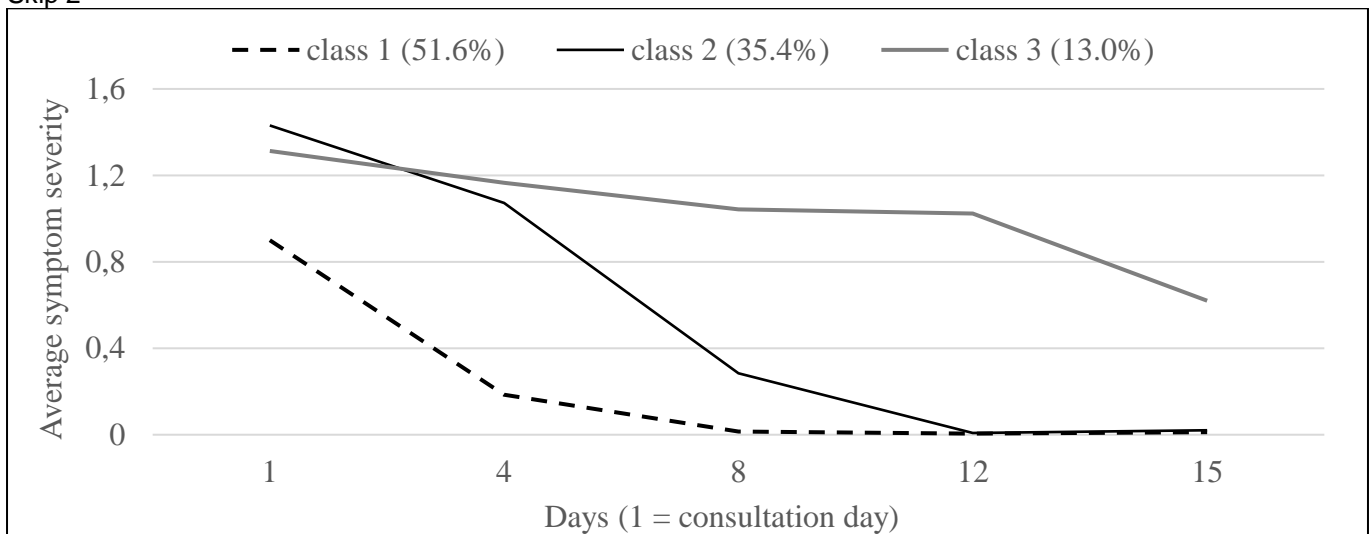
Skip 0



Skip 1

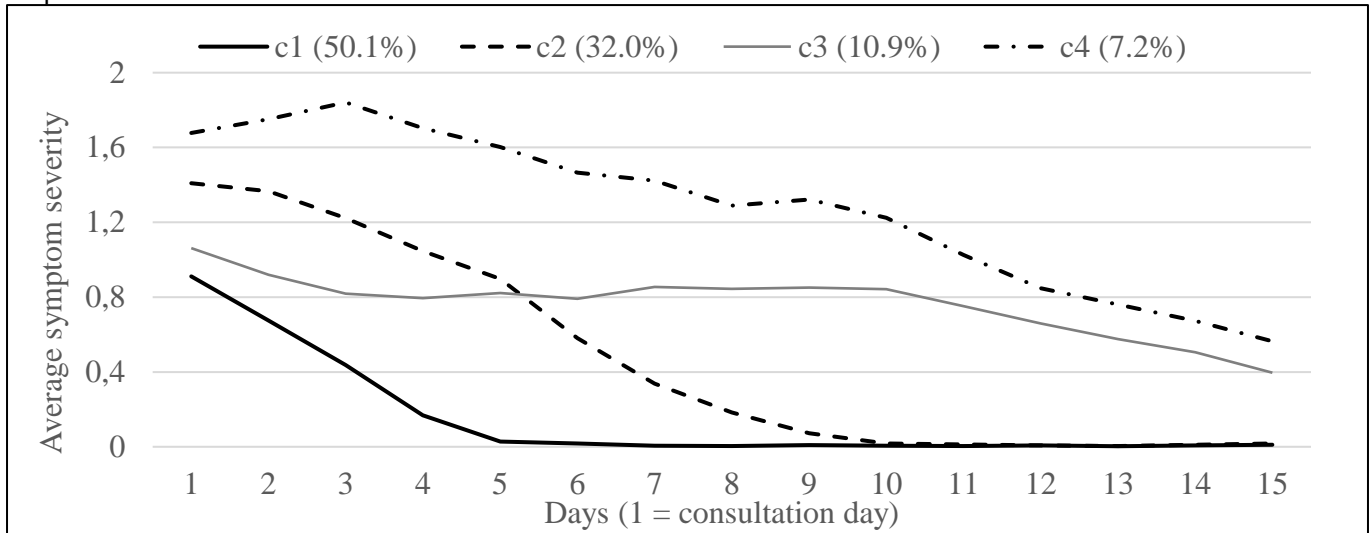


Skip 2

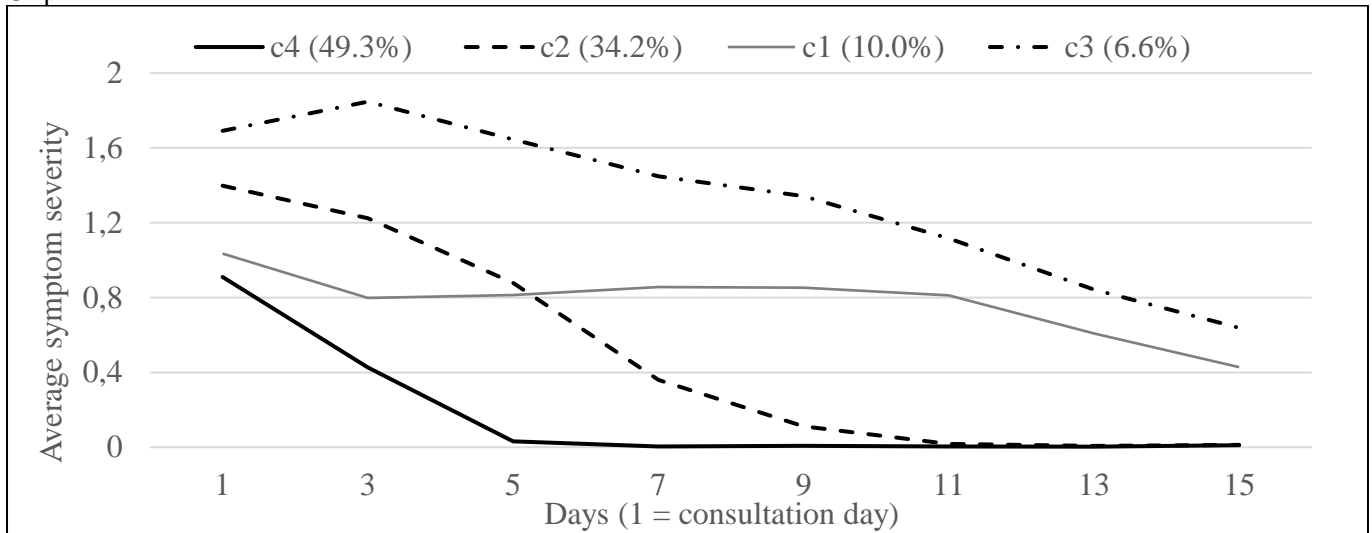


4-class models

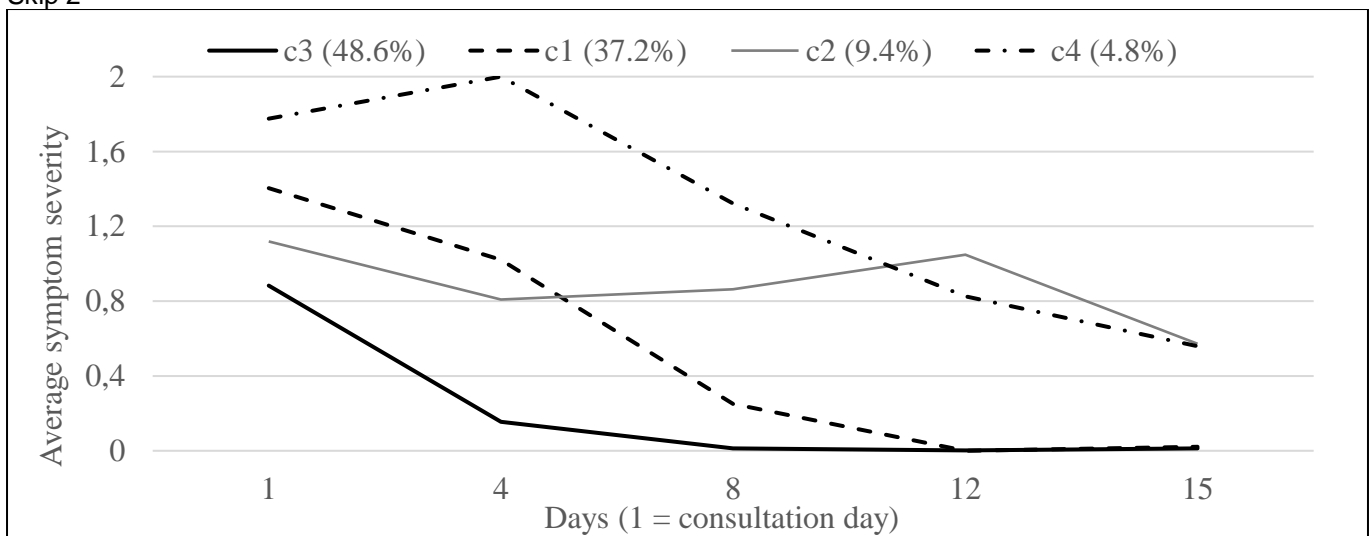
Skip 0



Skip 1

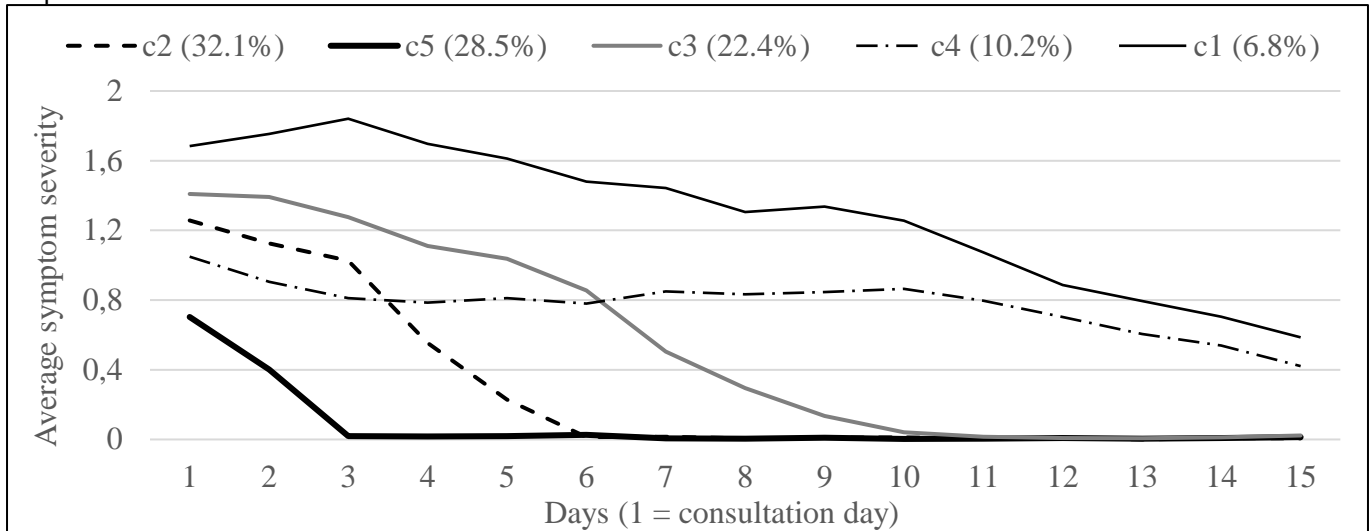


Skip 2

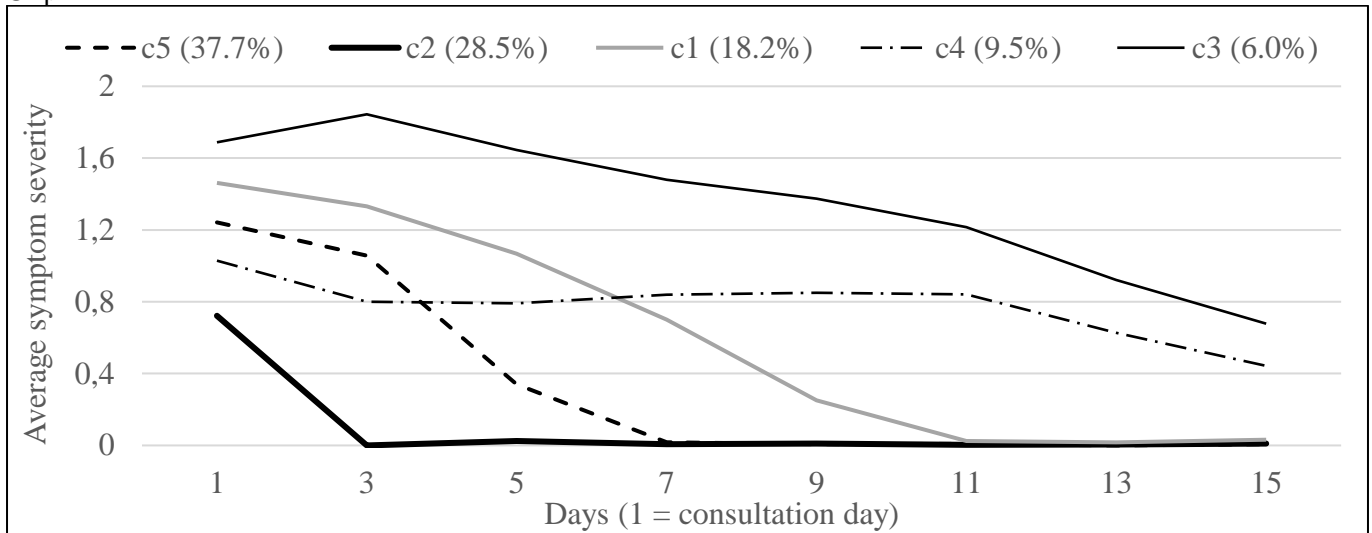


5-class models

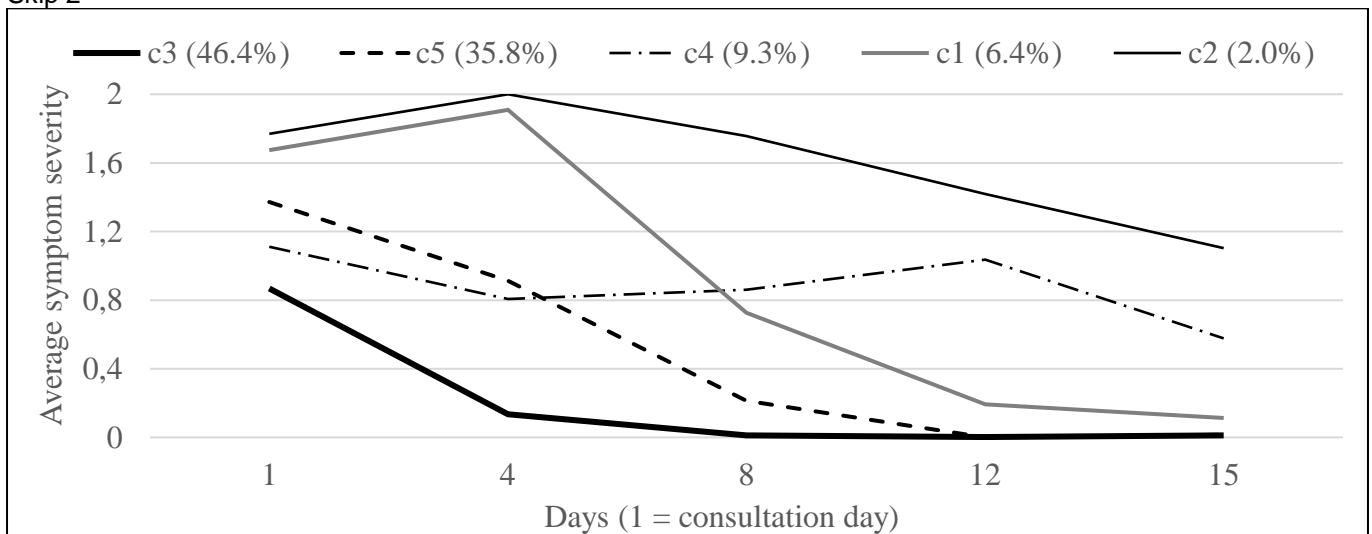
Skip 0



Skip 1



Skip 2



Supplementary Table S1. Univariable analyses of change† in cough severity from day of recruitment to the following day (day 2) in 1,385 children presenting to primary care with respiratory tract infection between July 2011 and May 2013§.

Variable	Reference group	“Exposed” group	Improved OR [95% CI]	Unchanged OR	Worse OR [95% CI]	p-value ^a
Age of child	2 – 15 years	0 – 1 year	1.20 [0.94, 1.53]	1.00 ref	1.65 [1.09, 2.50]	0.040
Gender	Female	Male	1.13 [0.90, 1.43]	1.00 ref	1.14 [0.76, 1.71]	0.532
Ethnicity	White	Non-white	1.16 [0.80, 1.67]	1.00 ref	1.03 [0.53, 2.01]	0.742
Mother smoking	No	Yes	1.20 [0.87, 1.64]	1.00 ref	0.81 [0.44, 1.49]	0.354
Living in 20% most deprived areas	No	Yes	0.74 [0.53, 1.03]	1.00 ref	0.81 [0.46, 1.45]	0.176
No of consultations last year	0 – 4 consultations	≥ 5 consultations	0.96 [0.62, 1.48]	1.00 ref	1.13 [0.54, 2.33]	0.918
Current asthma	No	Yes	1.31 [0.91, 1.91]	1.00 ref	1.65 [0.91, 2.98]	0.153
Previous asthma	No	Yes	1.21 [0.71, 2.06]	1.00 ref	1.08 [0.42, 2.81]	0.785
Pre-consultation illness duration	>3 days	≤3 days	1.21 [0.93, 1.57]	1.00 ref	1.42 [0.91, 2.21]	0.163
Severe dry cough ^b	No	Yes	1.27 [0.82, 1.99]	1.00 ref	0.90 [0.38, 2.16]	0.520
Severe productive cough ^b	No	Yes	1.41 [0.95, 2.07]	1.00 ref	1.06 [0.51, 2.18]	0.229
Severe barking cough ^b	No	Yes	1.10 [0.68, 1.79]	1.00 ref	0.83 [0.32, 2.12]	0.827
Any severe cough ^b	No	Yes	1.35 [1.00, 1.82]	1.00 ref	1.02 [0.59, 1.77]	0.139
Severe blocked or runny nose ^b	No	Yes	1.03 [0.66, 1.59]	1.00 ref	1.60 [0.83, 3.08]	0.396
Moderate-to-severe change in cry ^b	No	Yes	1.03 [0.72, 1.46]	1.00 ref	0.76 [0.38, 1.51]	0.686
Moderate-to-severe shortness of breath ^b	No	Yes	1.42 [1.09, 1.84]	1.00 ref	1.16 [0.73, 1.86]	0.034
Moderate-to-severe wheeze ^b	No	Yes	1.25 [0.97, 1.62]	1.00 ref	1.04 [0.66, 1.66]	0.236
Moderate-to-severe diarrhoea ^b	No	Yes	0.81 [0.45, 1.46]	1.00 ref	1.97 [0.93, 4.20]	0.141
Moderate-to-severe vomiting ^b	No	Yes	0.88 [0.61, 1.28]	1.00 ref	0.89 [0.46, 1.72]	0.774
Moderate-to-severe reduced fluid intake ^b	No	Yes	1.06 [0.77, 1.46]	1.00 ref	1.04 [0.59, 1.82]	0.944
Severe reduced food intake ^b	No	Yes	1.09 [0.68, 1.76]	1.00 ref	0.63 [0.22, 1.79]	0.564
Severe reduced energy ^b	No	Yes	0.73 [0.42, 1.28]	1.00 ref	0.67 [0.24, 1.91]	0.450
Severe disturbed sleep ^b	No	Yes	1.41 [1.05, 1.89]	1.00 ref	1.55 [0.95, 2.53]	0.036
Moderate-to-severe reduction in urine passed ^b	No	Yes	1.05 [0.66, 1.67]	1.00 ref	0.43 [0.13, 1.40]	0.255
Severe fever ^b	No	Yes	1.04 [0.67, 1.64]	1.00 ref	0.68 [0.27, 1.73]	0.651
Temperature ≥37·8°C at consultation	No	Yes	0.95 [0.67, 1.34]	1.00 ref	0.94 [0.51, 1.74]	0.941
Pallor	No	Yes	0.93 [0.71, 1.22]	1.00 ref	0.96 [0.60, 1.54]	0.873

Inter-/subcostal recession	No	Yes	2.05 [1.20, 3.50]	1.00 ref	0.87 [0.26, 2.92]	0.026
Inflamed pharynx/tonsils	No	Yes	0.92 [0.70, 1.20]	1.00 ref	0.96 [0.60, 1.54]	0.832
Wheeze assessed by clinician	No	Yes	1.29 [0.97, 1.72]	1.00 ref	1.11 [0.66, 1.87]	0.231
Crackles assessed by clinician	No	Yes	1.17 [0.89, 1.54]	1.00 ref	0.71 [0.41, 1.22]	0.168
Severity by parent	Quartiles 1-3	Top quartile	0.99 [0.70, 1.41]	1.00 ref	0.98 [0.53, 1.81]	0.997
Severity by clinician	Quartiles 1-3	Top quartile	1.11 [0.82, 1.50]	1.00 ref	0.87 [0.50, 1.53]	0.646

† 'Improved' and 'worse' is defined by change of ≥ 1 point on a 7 level Likert scale.

§ Number of children less than 1,408 due to missing data.

^a Pearson's χ^2 .

^b In the 24 hours prior to consultation.