

PATHWAYS

Life course partnership status and biomarkers in mid-life: Evidence from the 1958 British birth cohort

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Outline

- Background
- Methods
- A longitudinal typology of partnership status over the life course
- Results
- Conclusion
- Limitations



Background

- Previous studies have shown that marital status is associated with health outcomes and mortality.
- With a few exceptions studies of marital status and health have considered only current marital status or transitions over relatively short periods, therefore ignoring the accumulated benefits and risks of marital status trajectories over the lifecourse
- Furthermore, only a few studies have considered the association between non-marital cohabitation and health, a topic of increasing importance given that non –marital cohabitation is becoming more common



Background - II

- Of those studies which have used measures of health, most have employed self-reported measures
- In the few studies where objective health indicators were used, sample sizes were relatively small
- In this study we are employing a population based birth cohort and a modelling approach that allows us to capture stability as well as change in partnership status over the lifecourse
- Our objective is to investigate the cumulative effect that different trajectories of partnership status over the life-course have on biomarkers in mid-life



Sample

- The British 1958 birth cohort includes all persons born in England, Scotland and Wales during one week in March 1958
- Cohort members have been followed-up periodically from birth into adulthood. Our outcomes are derived from the clinical examination in their home undertaken in 2002 – 2004
- Marital status and cohabitation have been recorded from sweep 4 (1981) when participants were 23 years old
- We are using data from sweep4 (1981, age 23), sweep5 (1991, age 33), sweep6 (2000 age 42) and the biomedical survey (2002-2004 age 44 – 46) to derive the partnership status trajectories
- Early life SEP and health are derived from sweeps 0 – 3 (ages 1 – 16)



Measures I

- Inflammatory and haemostatic biomarkers: Fibrinogen, C – Reactive Protein (CRP), Von Willebrand Factor (VWF), Tissue plasminogen activator antigen (TPA) and Fibrin D- dimer (Ddimer).
- Metabolic syndrome: MS was characterized using the International Diabetes Federation definition
- Respiratory function: Scores on Force Vital Capacity - the maximum amount of air a person can expel from the lungs after a maximum inhalation.
- All models adjusted for early life SEP, cognitive ability @ 10, early life health status, education @ 23, self reported health status @ 23, BMI @ 23 and various lab processing related variables.



Measures II – Partnership status indicators

		Men				Women					
		f	%	f	%			f	%		
Married at 23	No	4083	65.2	2861	45.6	Cohabiting at 23	No *	5923	94.6	5813	92.8
	Yes	2179	34.8	3409	54.4		Yes	336	5.4	454	7.2
Married at 33	No	1660	31.0	1569	27.9	Cohabiting at 33	No	4780	89.2	5090	90.4
	Yes	3701	69.0	4063	72.1		Yes	581	10.8	542	9.6
Married at 40	No	1644	29.4	1667	28.9	Cohabiting at 40	No	5059	90.5	5251	91.1
	Yes	3948	70.6	4098	71.1		Yes	532	9.5	514	8.9
Married at 42	No	1220	27.0	1325	28.9	Cohabiting at 42	No	3921	87.8	3967	87.9
	Yes	3303	73.0	3262	71.1		Yes	543	12.2	547	12.1
Remarried by 42	No	8714	90.8	7945	88.7						
	Yes	881	9.2	1014	11.3						

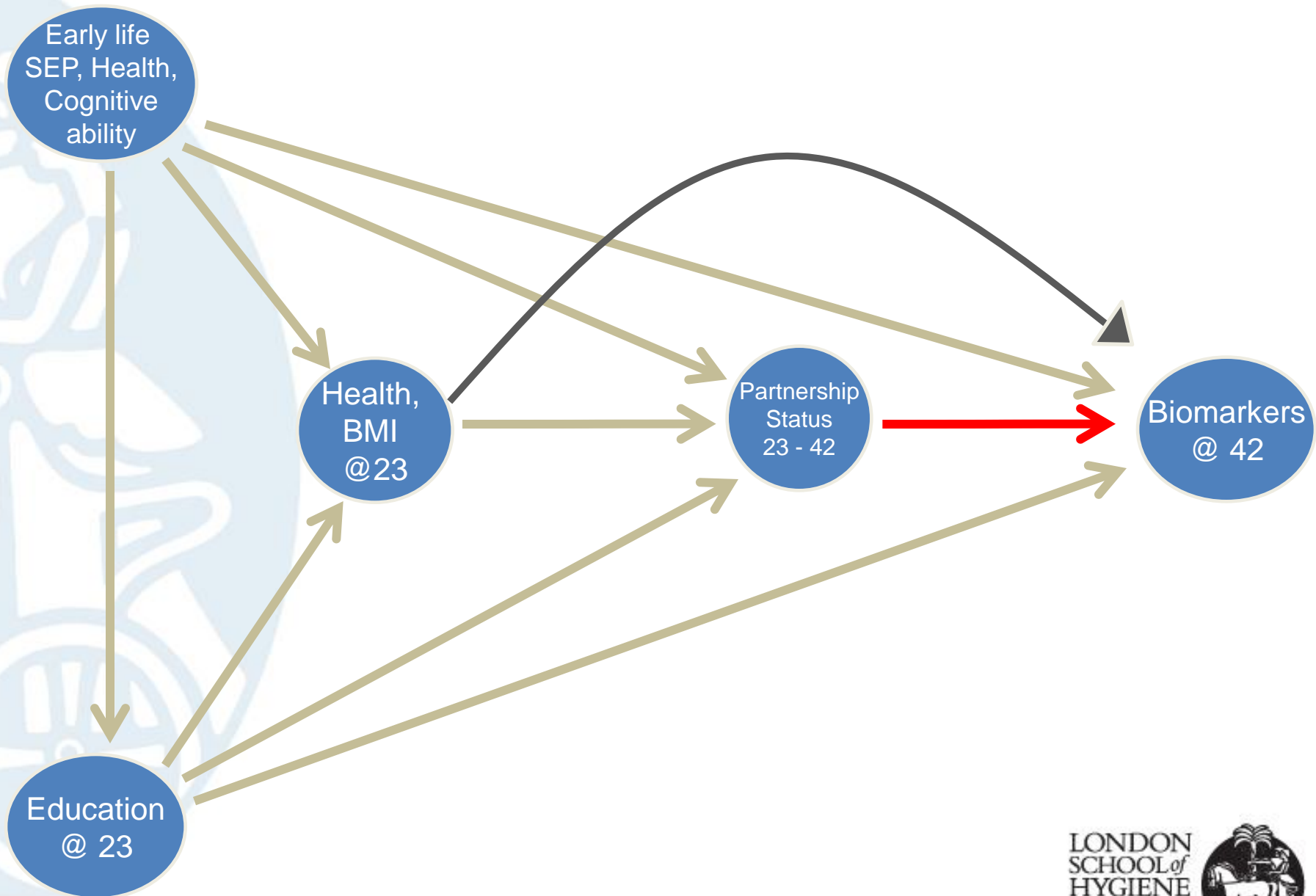
We included participants with valid responses in at least three indicators: Men = 4970, Women = 5256



Statistical Modelling

- Longitudinal Latent Class Analysis – Semi parametric model, introduces a discrete latent variable to capture common variation in the observed marital status and cohabitation indicators
- Forms latent classes - groups (trajectories) based on the pattern of responses to the observed indicators
- Simplest form of longitudinal latent variable modelling
- A data reduction method - in theory the number of possible response patterns in theory is $2^9 = 512$.
- However since participants who are married cannot simultaneously be non – married cohabiters there are three responses available at each wave making the number of possible response patterns equal to $2 \times (3^4) = 162$
- In this instance LCA is used to summarise these patterns creating longitudinal profiles – trajectories – in a parsimonious way that can be used in further analysis with appropriate link functions for the nature of the outcomes (linear and logit models)
- All models in Mplus 7.0, estimated with MLR, Monte Carlo integration.
- Missing data handled with FIML assuming MAR

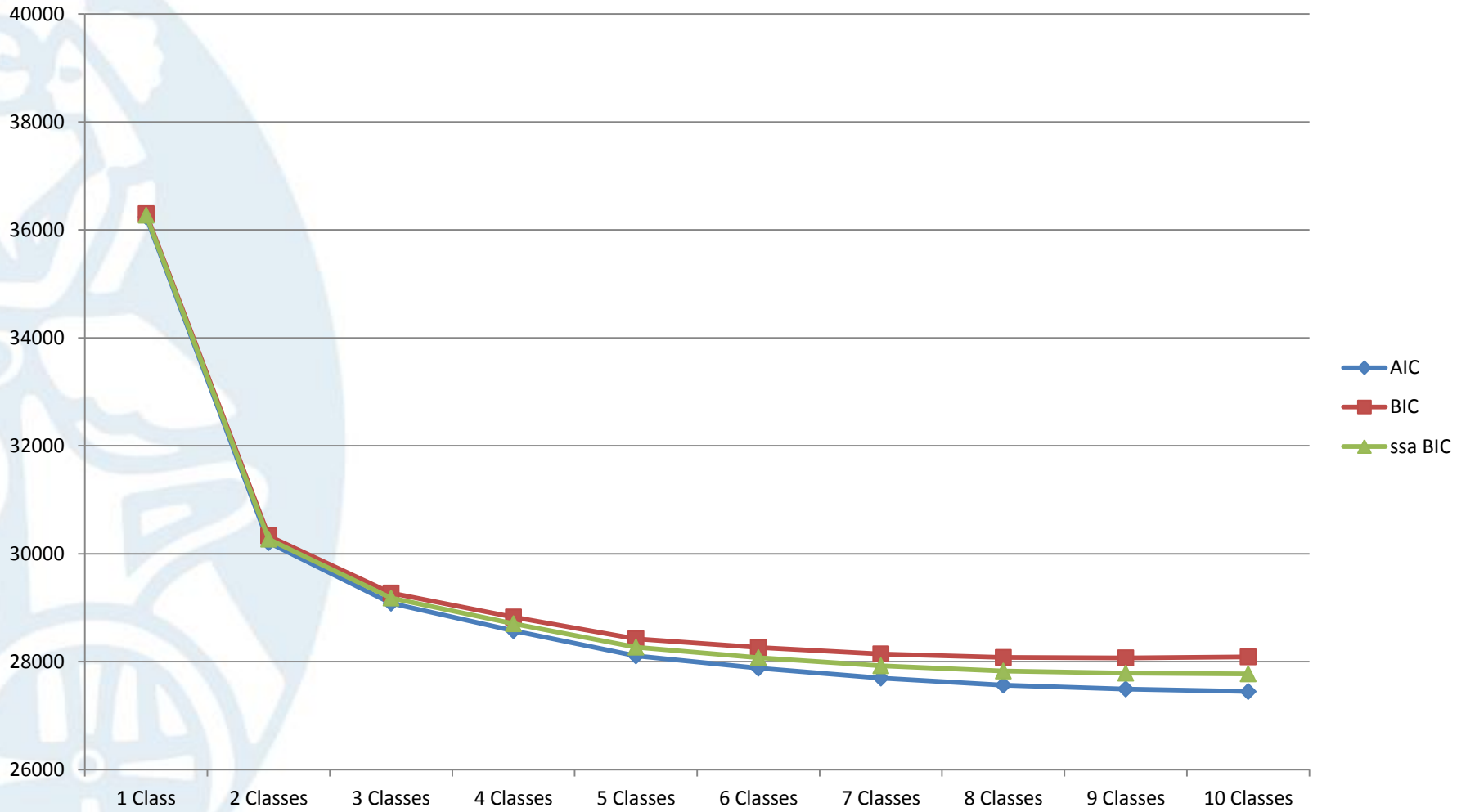




Results I – Model selection

Men	Parameters	Log-Likelihood	AIC	BIC	ssa BIC	Entropy	BLRT	p
1 Class	9	-18113.063	36244.126	36302.557	36273.958	1.000		
2 Classes	19	-15085.063	30208.127	30331.480	30271.105	0.927	6056.001	0.001
3 Classes	29	-14513.203	29084.406	29272.682	29180.530	0.946	1143.721	0.001
4 Classes	39	-14248.346	28574.693	28827.892	28703.964	0.931	529.713	0.001
5 Classes	49	-14004.856	28107.713	28425.835	28270.130	0.909	486.981	0.001
6 Classes	59	-13881.343	27880.687	28263.731	28076.250	0.922	247.026	0.001
7 Classes	69	-13779.315	27696.629	28144.612	27925.339	0.925	204.058	0.001
8 Classes	79	-13704.204	27566.407	28079.298	27828.264	0.912	150.222	0.001
9 Classes	89	-13657.883	27493.767	28071.580	27788.770	0.921	92.641	0.001
10 Classes	99	-13624.711	27447.421	28090.156	27775.570	0.924	66.347	0.001

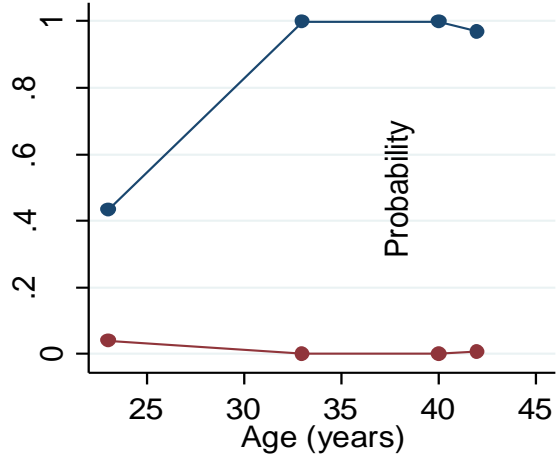
Men



Men

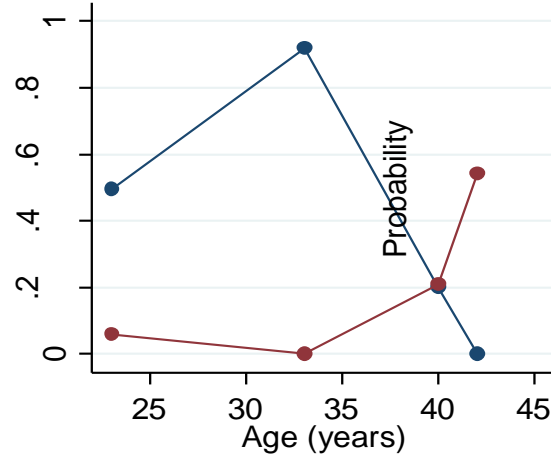
Class 1 (N = 3010, 61.7%)

Remarried probability: 0.125



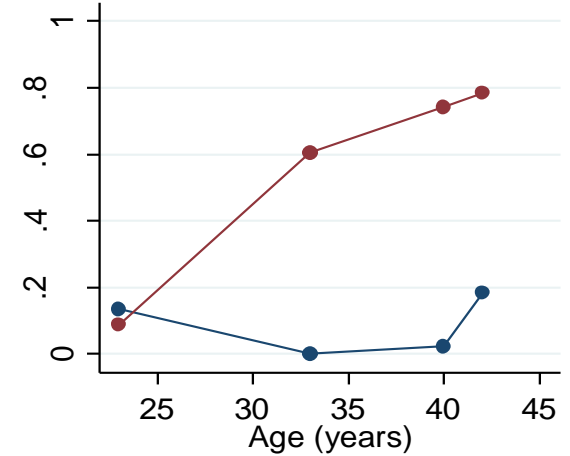
Class 2 (N = 401, 8.2%)

Remarried probability: 0.177



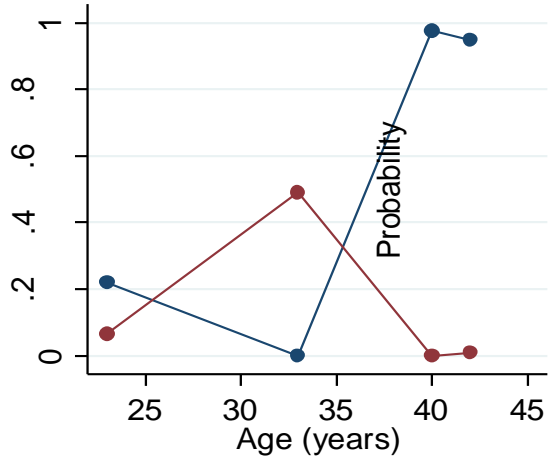
Class 3 (N = 362, 7.4%)

Remarried probability: 0.036



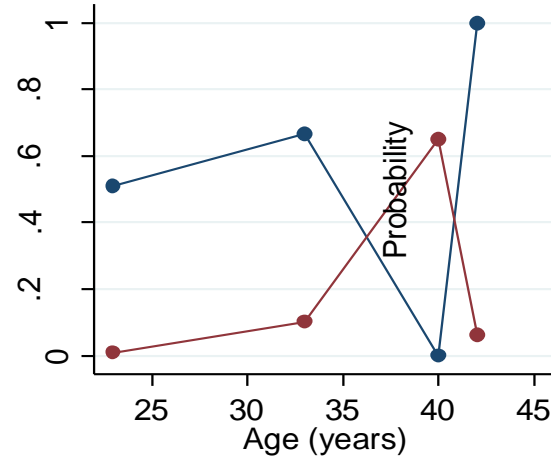
Class 4 (N = 462, 9.5%)

Remarried probability: 0.379



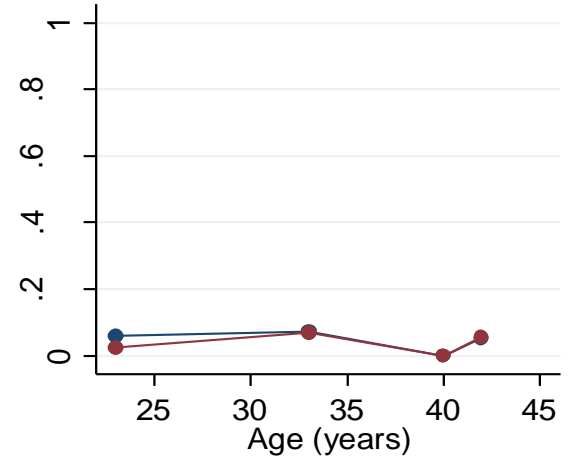
Class 5 (N = 100, 2.1%)

Remarried probability: 0.783



Class 6 (N = 542, 11.1%)

Remarried probability: 0.022

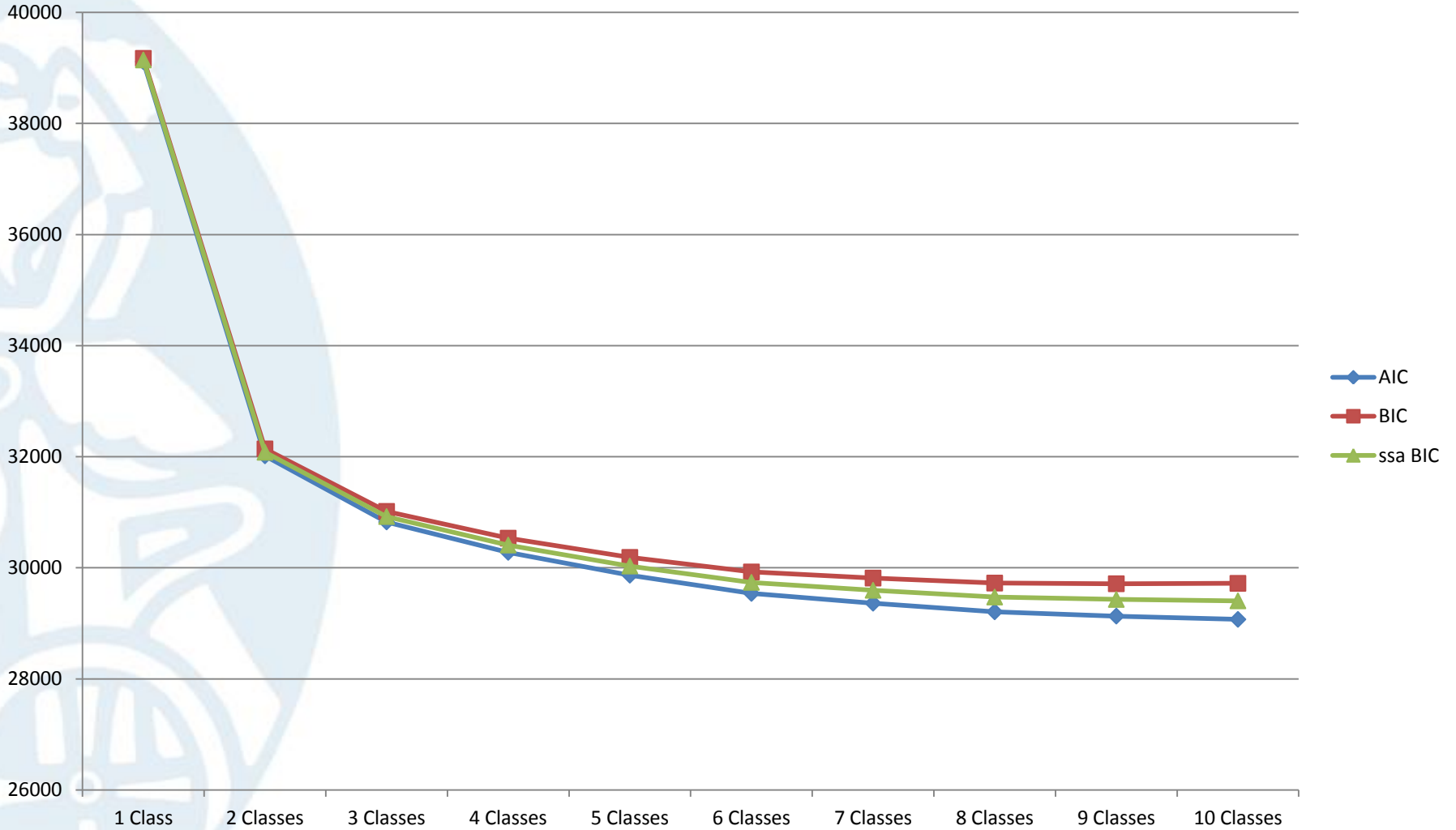


Results II – Model Selection

Women	Parameters	Log-Likelihood	AIC	BIC	ssa BIC	Entropy	BLRT	p
1 Class	9	-19548.128	39114.255	39173.193	39144.594	1.000		
2 Classes	19	-15989.385	32016.771	32141.196	32080.820	0.945	7117.485	0.001
3 Classes	29	-15383.938	30825.875	31015.787	30923.635	0.962	1210.895	0.001
4 Classes	39	-15100.217	30278.435	30533.834	30409.905	0.940	567.440	0.001
5 Classes	49	-14884.450	29866.899	30187.785	30032.079	0.918	431.536	0.001
6 Classes	59	-14710.590	29539.180	29925.553	29738.071	0.905	347.719	0.001
7 Classes	69	-14612.640	29363.279	29815.139	29595.880	0.916	195.901	0.001
8 Classes	79	-14524.971	29207.942	29725.289	29474.253	0.935	175.337	0.001
9 Classes	89	-14476.328	29130.656	29713.489	29430.677	0.933	97.286	0.001
10 Classes	99	-14436.959	29071.918	29720.239	29405.650	0.938	78.737	0.001



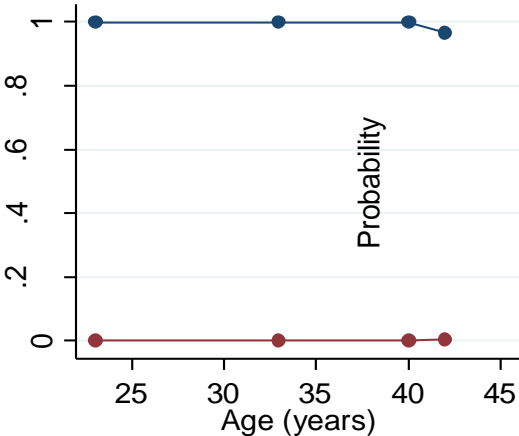
Women



Women

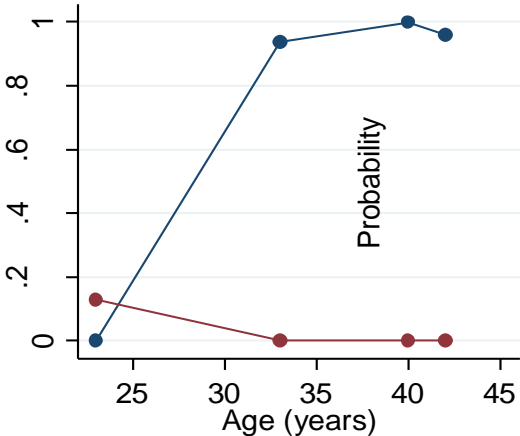
Class 1 (N = 2168, 42.0%)

Remarried probability: 0.139



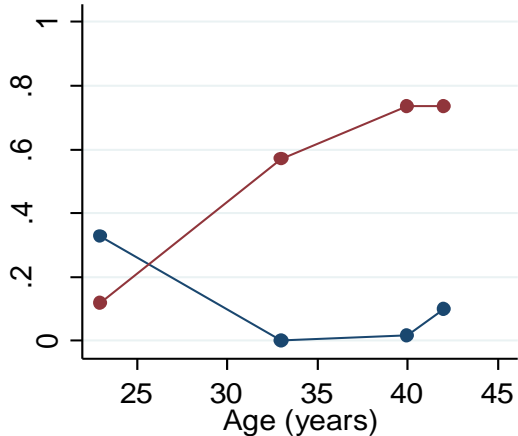
Class 2 (N = 1199, 23.2%)

Remarried probability: 0.121



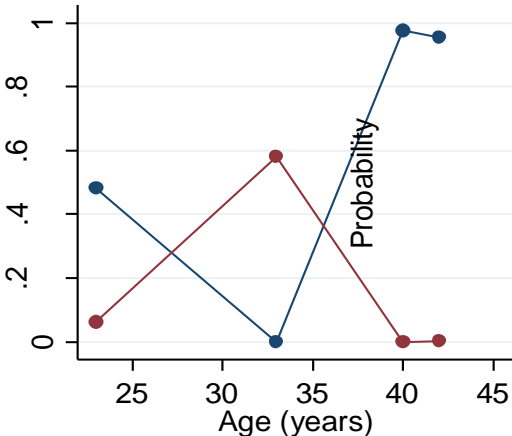
Class 3 (N = 415, 8.0%)

Remarried probability: 0.080



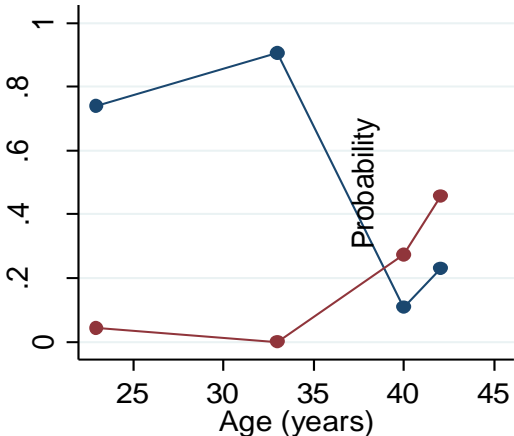
Class 4 (N = 291, 5.6%)

Remarried probability: 0.659



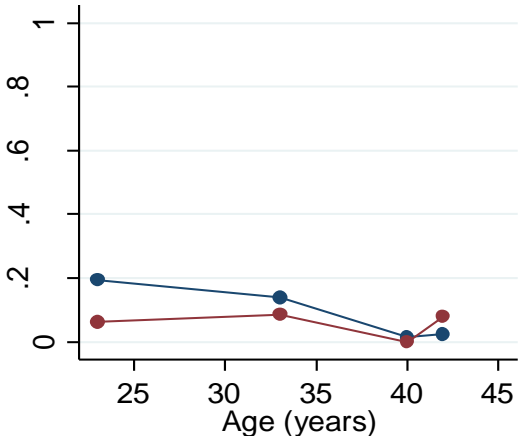
Class 5 (N = 446, 8.6%)

Remarried probability: 0.316



Class 6 (N = 641, 12.4%)

Remarried probability: 0.024



Results - Men

<i>Fibrinogen</i>			<i>CRP</i>		<i>VWF</i>		<i>TPA</i>	
Class1	0		0		0		0	
Class2	0.019	-0.006 to 0.045	0.131	-0.006 to 0.268	0.029	-0.010 to 0.069	0.036	-0.029 to 0.100
Class3	0.010	-0.014 to 0.033	-0.013	-0.161 to 0.135	-0.001	-0.046 to 0.044	0.026	-0.041 to 0.093
Class4	0.008	-0.015 to 0.031	0.008	-0.113 to 0.128	0.003	-0.036 to 0.041	0.003	-0.053 to 0.059
Class5	0.028	-0.021 to 0.076	0.064	-0.215 to 0.342	-0.006	-0.081 to 0.070	0.045	-0.078 to 0.169
Class6	0.034	0.012 to 0.056	0.148	0.025 to 0.270	0.020	-0.016 to 0.057	0.061	0.006 to 0.116
<i>Ddimer</i>			<i>Metabolic Syndrome</i>		<i>FVC</i>			
Class1	0		1		0			
Class2	0.035	-0.036 to 0.105	0.756	0.575 to 0.993	0.071	-0.026 to 0.168		
Class3	0.043	-0.029 to 0.114	1.067	0.808 to 1.410	-0.112	-0.214 to -0.009		
Class4	0.054	-0.014 to 0.123	1.077	0.843 to 1.376	-0.076	-0.168 to 0.015		
Class5	0.016	-0.116 to 0.148	0.759	0.457 to 1.261	0.050	-0.129 to 0.229		
Class6	0.038	-0.029 to 0.105	0.867	0.677 to 1.111	-0.130	-0.225 to -0.035		



Results - Women

<i>Fibrinogen</i>		<i>CRP</i>		<i>VWF</i>		<i>TPA</i>		
Class1	0	0		0		0		
Class2	-0.018	-0.035 to -0.002	-0.087	-0.186 to 0.011	-0.011	-0.038 to 0.017	-0.036	-0.081 to 0.010
Class3	0.001	-0.023 to 0.023	-0.032	-0.173 to 0.110	-0.014	-0.055 to 0.027	-0.011	-0.075 to 0.053
Class4	0.010	-0.018 to 0.038	0.195	0.028 to 0.361	0.038	-0.008 to 0.085	-0.026	-0.111 to 0.058
Class5	-0.012	-0.037 to 0.014	-0.013	-0.161 to 0.134	0.003	-0.040 to 0.045	0.012	-0.058 to 0.082
Class6	0.028	0.006 to 0.050	0.029	-0.104 to 0.162	0.022	-0.015 to 0.058	-0.030	-0.088 to 0.028
<i>Ddimer</i>		<i>Metabolic Syndrome</i>		<i>FVC</i>				
Class1	0	1		0				
Class2	-0.002	-0.048 to 0.043	1.009	0.810 to 1.257	0.054	0.002 to 0.106		
Class3	0.016	-0.046 to 0.079	0.673	0.481 to 0.943	0.026	-0.046 to 0.098		
Class4	-0.037	-0.105 to 0.031	1.043	0.712 to 1.528	0.004	-0.094 to 0.101		
Class5	-0.064	-0.131 to 0.002	0.778	0.560 to 1.081	0.033	-0.043 to 0.109		
Class6	-0.012	-0.070 to 0.047	0.776	0.581 to 1.038	-0.051	-0.116 to 0.014		



Conclusion

- Partnership status patterns are associated with biomarkers in mid adulthood
- The observed effects differed between men and women implying that the mechanisms that link partnership status and health may be gender specific
- In men, those that never married or cohabited had significantly higher levels on three haemostatic function biomarkers as well as worse respiratory function compared to men that were married and remained married for the duration of the observation period



Conclusion - II

- In women those that married in mid/late 20's or early 30's and remained married for the whole observation period had the best health
- Women that never married or cohabited had worse health compared to married women
- However, this effect was only manifested in fibrinogen levels, indicating that not marrying or cohabiting is less detrimental in women compared to men or that being married appears to be more beneficial to men



Conclusion - III

- We found that with the exception of worse respiratory function in men, non-marital cohabitation has similar effects to being married on mid-life health
- Not married cohabiters of both genders did not differ from married participants in the biomarkers used in our study
- We also found that for both genders transitions from and to marriage or non-marital cohabitation do not have a detrimental effect on mid-life health



Limitations

- Despite the wealth of the 1958 cohort, bias due to unknown unmeasured confounders cannot be ruled out, although sensitivity analysis where potential confounders were simulated supported our results
- The longitudinal typology captured the cumulative effect over 21 years of trajectories of partnership status in biomarkers in mid-life. Investigation of the short term effects of events such as marital dissolution was not possible with this approach
- Data on partnership status were based on self-reports. Although the latent variable specification of our longitudinal typology controls for measurement error, extreme bias (a participant misreporting in all nine indicators of our typology) may have influenced our results
- Our results can only be generalised to those born in 1958 and perhaps to other cohorts born close to this year



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