

## Appendices to:

### Predicting treatment outcome in psychological treatment services by identifying latent profiles of patients.

#### Content:

Appendix 1: Model comparison statistics

Appendix 2: Graphical representation and description of the latent profiles

Appendix 3: Odds ratios comparing profiles over treatment outcomes

Appendix 4: Mean symptom scores for LPs by intensity of intervention

#### **Appendix 1:**

The AIC, BIC, Adj-BIC, VLMR-LRT p-value and entropy value were compared for each profile solution and presented in Table A1 below.

**Table A1. Model comparison statistics for both split samples.**

<u>Discovery sample 1a</u>					
	AIC	BIC	Adj-BIC	VLMR-LRT (p=)	Entropy
k = 2	265442	265604	265531	<0.05	0.798
k = 3	262848	263080	262975	<0.05	0.765
k = 4	262079	262382	262245	<0.05	0.725
k = 5	261548	261920	261752	<0.05	0.743
k = 6	260872	261315	261114	<0.05	0.751
k = 7	260533	261046	260814	<0.05	0.73
<b>k = 8</b>	<b>260282</b>	<b>260865</b>	<b>260602</b>	<b>&lt;0.05</b>	<b>0.722</b>
k = 9	260044	260697	260402	0.3512	0.71
<u>Discovery sample 1b</u>					
	AIC	BIC	Adj-BIC	VLMR-LRT (p=)	Entropy
k = 2	265744	265906	265833	<0.05	0.788
k = 3	263059	263290	263186	<0.05	0.771
k = 4	262377	262680	262543	<0.05	0.718
k = 5	261769	262141	261973	<0.05	0.734
k = 6	261079	261522	261321	<0.05	0.745
k = 7	260689	261202	260970	<0.05	0.728
<b>k = 8</b>	<b>260341</b>	<b>260925</b>	<b>260661</b>	<b>&lt;0.05</b>	<b>0.739</b>
k = 9	260147	260800	260505	0.094	0.714

AIC=Akaike Information Criterion; BIC=Bayesian Information Criterion;  
Adj-BIC=Sample size adjusted Bayesian Information Criterion;  
VLMR-LRT=Vuong-Lo-Medell-Rubin Likelihood Ratio test.

## Appendix 2:

A graphical representation and description of the latent profiles is provided below.

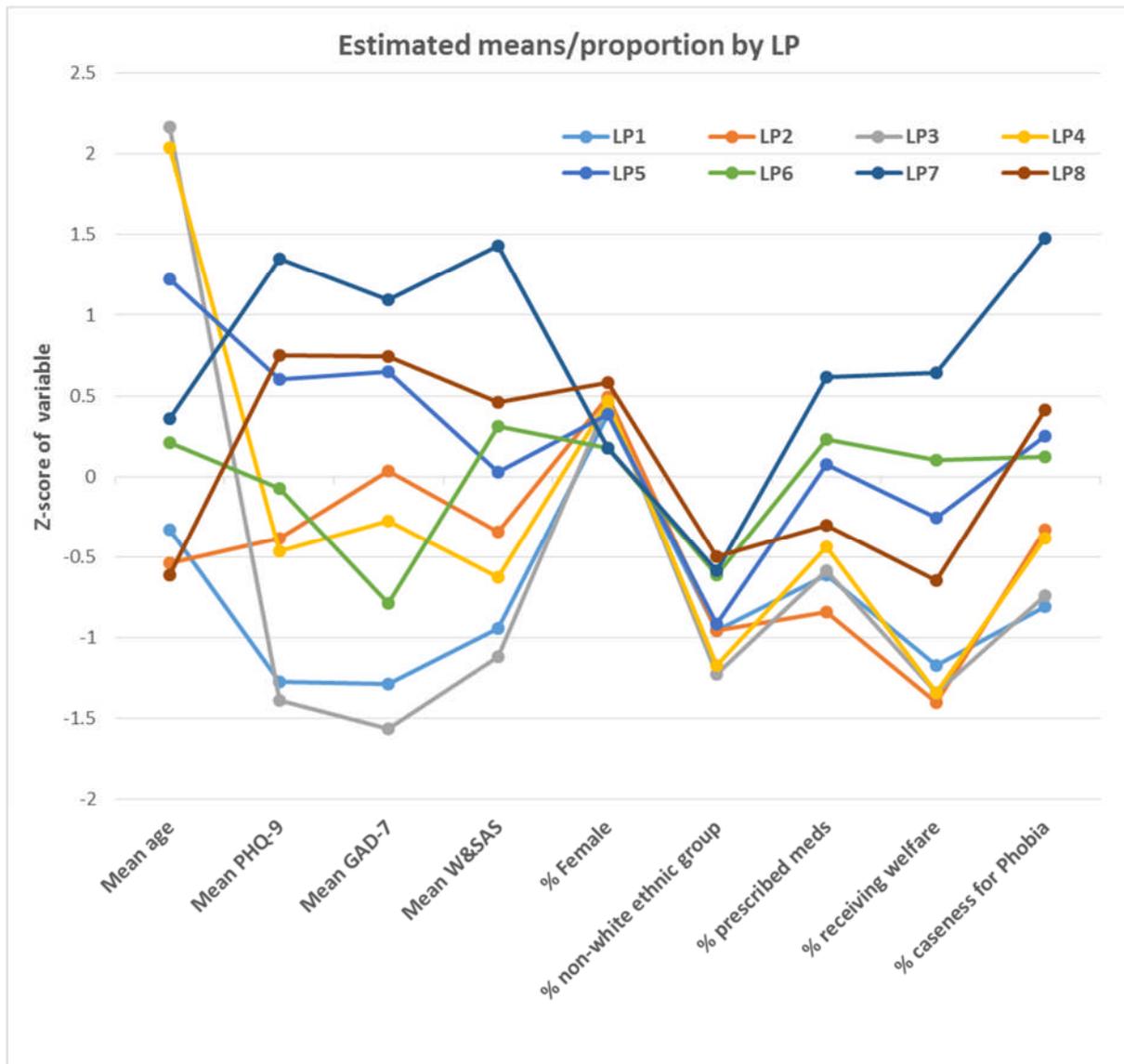


Figure B1. Graphical representation of the distribution of patient variables between latent profiles.

The distribution of the patient variables for each LP is presented in figure B1. Due to the different scaling of the continuous and dichotomous items included in the latent profile analysis, it was not possible to directly compare the mean scores and proportions of each variable between LPs. Instead, all mean scores and proportions for each item were standardised and z-scores were used to present the distribution between mean scores and proportions for each profile.

In addition to the graphical representation of the LPs, a more detailed description of each LP is provided below:

*LP1.*

In comparison to the full sample of patients attending the services, members of LP1 are younger and have lower mean scores on both the PHQ-9 and GAD-7, suggesting a less severe population of patients. The mean W&SAS score was also much lower than the full sample mean suggesting social and occupational functioning is less impaired in this profile compared to the full sample. Patients in LP1 were less likely to meet caseness for phobia, receiving welfare benefits or prescribed medication. The percentage of the population in LP1 who are female is very similar to the full sample percentage, as is the proportion of individuals from ethnic groups. In sum LP1 are a younger and less severe population, with limited functional impairment issues, low scores on the phobia scales, and less likely to be prescribed psychotropic medication or to be on welfare benefits. LP1 make up 18% of the population taken into treatment.

*LP2.*

Members of LP2 have a lower mean age than the full sample of patients attending the services, and are slightly younger than members of LP1. The mean level of anxiety severity (GAD-7) for patients in LP2 is similar to the full sample mean, whereas mean depression severity (PHQ-9) is slightly lower. The mean social and occupational functioning impairment score for this profile is lower than for the full sample suggesting less impairment from symptoms. Individuals in LP2 have a lower probability of phobia, are very unlikely to be receiving welfare or prescribed medication when compared to the full sample. The percentage of females in this profile is slightly higher than for the full population (69% vs 66%), and the percentage of individuals from ethnic groups is slightly lower than the full sample (17% vs 22%). The description of this population suggests a group of patients whose symptoms are less chronic or potentially the first presentation to the services with consideration to the younger age, low probability of psychotropic medication and welfare. LP2 are most frequent LP taken into treatment (22.7% of the full sample).

*LP3.*

This profile of patients have lowest mean symptom severity scores and the lowest functional impairment issues compared to all the LPs, suggesting a less disabled group of patients. The likelihood of being female, receiving welfare benefits, prescribed medication and caseness for phobia is also low. The proportion of individuals from non-white ethnic groups is very low at 11% compared to the full sample (22%) and is the lowest of all the profiles. LP3 is also has the highest mean age (67 years old). This sub group make up only 3.1% of the full sample taken into treatment. This is a profile of older patients, who may be attending services for less severe common mental health disorders.

*LP4.*

Patients in LP4 have a mean age of 65 years old, making them the second oldest group of patients after LP3. Other similarities to LP3 are the proportion of female patients, medication prescription, non-white ethnic group proportion and the likelihood of receiving benefits. However, patients in LP4 typically have higher mean symptom scores (mild to moderate symptom severity), and more functioning issues as scored on the W&SAS compared to LP3. The levels of severity are slightly lower than the mean for the full sample. The percentage of the population in LP4 is just 4.1% suggesting this group of patients are not frequent attenders of the services.

#### *LP5.*

In comparison to the full sample of patients, LP5 have a higher mean age, as well as a higher mean PHQ-9 and GAD-7 scores at presentation to the services. The level of functioning appears to be similar to the mean of the full sample. The incidence of phobia, proportion prescribed medication and likelihood of receiving welfare benefits are higher than for the full population, which suggests that there may be more disability as a result of symptoms in this profile of patients. LP5 have a slightly lower percentage of individuals from ethnic groups compared to the full sample. The incidence of LP5 in the full population is 8.5%. Compared to the previous four profiles, LP5 appear to have more severe levels of disability, indicated by higher symptoms, functional impairment, higher likelihood of psychotropic medication prescription and higher incidence of phobia.

#### *LP6.*

Whereas the other LPs and the full sample show similar levels of symptom severity on both the PHQ-9 and GAD-7 (i.e. within a point or two on each measure), LP6 are the only profile where there is a reasonable difference in mean depression and anxiety severity. The mean anxiety severity is 8 compared to a mean depression score of 13 for this profile, suggesting they may be attending the services for more depression focused symptoms and treatment. The mean age is similar to the full sample mean, and percentage of female patients is also close. The probability of being prescribed medication (59%) and receiving welfare benefits (54%) is higher in this profile of patients compared to the full sample, which may suggest a more chronic group of patients. The proportion of patients taken into treatment who are from LP6 was 9.1%.

#### *LP7.*

Patients in LP7 present to services with the highest baseline symptom compared to all other profiles, with mean scores 9 and 6 points higher than the full sample means on the PHQ-9 and GAD-7 respectively. Mean age is slightly higher than the full sample mean and that of LP6. The level of functional impairment is also high, which may be consistent with the higher symptom severity scores. Over 90% of the group are self-rated as phobic, over 70% have been prescribed psychotropic medication and nearly 75% are receiving welfare benefits suggesting a much more disabled group. The percentage of non-white ethnic groups is higher compared to the full sample (28% vs 22%). LP7 make up over 9% of the sample of patients entering treatment.

#### *LP8.*

LP8 are the profile of patients with the highest proportion of non-white ethnic group patients attending the services (31%). They are also the youngest group of patients attending the services with a mean age of almost 30 years. Individuals in this profile are more likely to be female compared to the other profiles (72%). The mean PHQ-9 and GAD-7 scores are higher than the full sample mean scores, and patients in this profile have the second highest symptom scores of all profiles after LP7. The probability of receiving welfare benefits or being prescribed medication is very similar to the overall percentage of the population and therefore this group of patients may represent a younger and more acute profile of patients attending the services.

### Appendix 3:

The odds ratios between all profiles for the four outcomes using the discovery samples are presented below. Each table displays the odds ratio comparing the vertical LP with the horizontal LP. For example, the odds ratio of recovery in Table C1 comparing LP2 with LP1 is 0.4.

**Table C1. Odds ratios of recovery between each patient profile.**

	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8
LP1	x	2.47**	1.09	2.23**	6.82**	3.38**	16.75**	7.04**
LP2	0.4**	x	0.44*	0.9	2.76**	1.34**	6.78**	2.85**
LP3	0.92	2.27*	x	2.05^	6.27**	3.11**	15.4**	6.47**
LP4	0.48**	1.11	0.49^	x	3.05**	1.52**	7.5**	3.15**
LP5	0.15**	0.36**	0.16**	0.33**	x	0.5**	2.46**	1.03
LP6	0.29**	0.73**	0.32**	0.66**	2.02**	x	4.95**	2.08**
LP7	0.06**	0.15**	0.06**	0.13**	0.41**	0.2**	x	0.42**
LP8	0.14**	0.35**	0.15**	0.32**	0.97	0.48**	2.38**	x

^  $p < 0.05$ , \*  $p < 0.01$ , \*\*  $p < 0.001$

**Table C2. Odds ratios of reliable change or recovery between each patient profile.**

	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8
LP1	x	1.87**	1.11	1.85**	4.02**	2.91**	10.68**	4.45**
LP2	0.53**	x	0.6	0.99	2.15**	1.56**	5.71**	2.38**
LP3	0.9	1.68**	x	1.66	3.61**	2.61*	9.59**	3.99**
LP4	0.54**	1.01	0.6	x	2.17**	1.57**	5.77**	2.4**
LP5	0.25**	0.47**	0.28**	0.46**	x	0.72**	2.66**	1.11
LP6	0.34**	0.64**	0.38*	0.64**	1.38**	x	3.67**	1.53**
LP7	0.09**	0.18**	0.1**	0.17**	0.38**	0.27**	x	0.42**
LP8	0.22**	0.42**	0.25**	0.42**	0.9	0.65**	2.4**	x

^  $p < 0.05$ , \*  $p < 0.01$ , \*\*  $p < 0.001$

**Table C3. Odds ratios of treatment drop out between each patient profile.**

	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8
LP1	x	0.81^	1.79	1.41^	0.89	0.74*	0.54**	0.54**
LP2	1.23^	x	2.21^	1.74**	1.1	0.92	0.67**	0.67**
LP3	0.56	0.45^	x	0.79	0.5^	0.41*	0.3**	0.3**
LP4	0.71^	0.58**	1.27	x	0.63**	0.53**	0.39**	0.38**
LP5	1.12	0.91	2.01^	1.58**	x	0.83	0.61**	0.61**
LP6	1.34*	1.09	2.41*	1.9**	1.2	x	0.73**	0.73**
LP7	1.84**	1.49**	3.29**	2.59**	1.64**	1.37**	x	1
LP8	1.84**	1.5**	3.31**	2.6**	1.65**	1.37**	1	x

^  $p < 0.05$ , \*  $p < 0.01$ , \*\*  $p < 0.001$

**Table C4. Odds ratios of deterioration between each patient profile.**

	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8
LP1	x	1.3	0.62	1.06	1.73*	0.51**	2.34**	1.83**
LP2	0.77	x	0.48^	0.82	1.33^	0.39**	1.8**	1.41*
LP3	1.62	2.1^	x	1.72	2.79*	0.82	3.78**	2.96*
LP4	0.94	1.23	0.58	x	1.62^	0.48**	2.2**	1.72*
LP5	0.58*	0.75^	0.36*	0.62^	x	0.29**	1.36	1.06
LP6	1.96**	2.56**	1.22	2.09**	3.39**	x	4.59**	3.6**
LP7	0.43**	0.56**	0.26**	0.45**	0.74	0.22**	x	0.78
LP8	0.55**	0.71*	0.34*	0.58*	0.94	0.28**	1.28	x

^  $p < 0.05$ , \*  $p < 0.01$ , \*\*  $p < 0.001$

**Appendix 4:**

**Table D1. Mean initial PHQ-9 and GAD-7 scores for patients receiving brief interventions or formal psychological therapies, split by latent profile.**

	Initial PHQ9 score					Initial GAD7 score				
	Brief interventions		Formal Interventions		t-test p-value	Brief interventions		Formal interventions		t-test p-value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
<b>LP1</b>	6.71	3.12	7.33	3.24	<b>0.01</b>	8.22	2.16	7.74	2.45	<b>0.01</b>
<b>LP2</b>	11.38	3.11	10.86	3.31	<b>0.00</b>	12.53	2.95	12.85	2.93	<b>0.01</b>
<b>LP3</b>	7.83	3.80	8.41	3.63	0.47	5.87	3.39	5.00	3.22	0.23
<b>LP4</b>	10.59	3.45	11.11	3.61	0.07	11.16	3.15	10.91	3.55	0.36
<b>LP5</b>	17.64	3.36	17.95	3.45	0.13	15.92	2.70	15.81	2.95	0.51
<b>LP6</b>	13.92	3.05	13.62	3.27	0.10	8.13	2.65	8.30	2.70	0.27
<b>LP7</b>	22.73	2.74	22.84	2.93	0.43	18.28	2.52	18.33	2.62	0.69
<b>LP8</b>	18.69	2.98	18.73	3.38	0.76	16.29	2.73	16.47	2.96	0.11

Independent samples t-test p-values are presented. Values significant at  $p < 0.05$  are highlighted in bold.