### ESM Table 1. Characteristics of all cardiac surgery patients in the mental recovery group and non-recovery group.

| Demographics                                      | All (n=807) | R (n=574) | NR (n=233) | p-value |
|---------------------------------------------------|-------------|-----------|------------|---------|
| **Baseline SF 36 mental domain score**            | 68 [54-81]  | 65 [49-77]| 78 [67-89]| <0.001* |
| **Body Mass Index (kg/m^2)**                      | 27 [25-30]  | 26.9 [24.68-29.43] | 27.1 [24.8-29.65] | 0.503 |
| **Comorbidities**                                 |             |           |            |         |
| CVA (%)                                           | 1.5         | 1.6       | 1.3        | 0.766   |
| Neurologic dysfunction (%)                        | 1.9         | 1.9       | 1.7        | 0.849   |
| **Cardiac status**                                |             |           |            |         |
| Unstable AP (%)                                   | 3.5         | 3.3       | 3.9        | 0.698   |
| **EuroSCORE II**                                  | 1.6 [1.1-2.7]| 1.5 [1.0-2.6]| 1.7 [1.1-2.9]| 0.118 |
| **Age (%)**                                       | 68.9 [62.4-75.1] | 69 [62.85-75.1] | 68.8 [61.84-75.1] | 0.776 |
| **Gender male (%)**                               | 76          | 76.8      | 74.2       | 0.436   |
| **Creatinine clearance (umol/l)**                 | 84 [73-96]  | 84 [74-96] | 82 [72-96] | 0.251   |
| **Extracardiac arteriopathy (%)**                 | 7.6         | 7.0       | 9.0        | 0.320   |
| **Previous cardiac surgery (%)**                  | 1.9         | 1.9       | 1.7        | 0.849   |
| **Critical pre-operative state (%)**              | 0.5         | 0.5       | 0.4        | 0.864   |
| **Diabetes (%)**                                  | 18.5        | 17.9      | 19.7       | 0.551   |
| **NYHA Class III or IV (%)**                      | 54          | 51        | 59.7       | 0.026*  |
| **Angina CCS Class IV (%)**                       | 2.0         | 1.9       | 2.1        | 0.832   |
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| **Diabetes (%)**                                  | 18.5        | 17.9      | 19.7       | 0.551   |
| **NYHA Class III or IV (%)**                      | 54          | 51        | 59.7       | 0.026*  |
| **Angina CCS Class IV (%)**                       | 2.0         | 1.9       | 2.1        | 0.832   |
| **LVEF (%)**                                      |             |           |            | 0.683   |
| Good                                              | 77.2        | 77.7      | 76         |         |
| Moderate                                          | 18.2        | 17.4      | 20.2       |         |
| Poor                                              | 3.6         | 3.7       | 3.4        |         |
| missing                                           | 1.0         | 1.2       | 0.4        |         |
| Recent MI (%)                                     | 21.7        | 17.9      | 30.9       | 0.001*  |
| Pulmonary hypertension (%)                        | 12.8        | 13.9      | 0.9        | 0.108   |
| Urgency (%)                                       | 49.8        | 53.8      | 39.9       | 0.001*  |
| Elecronic                                          | 48.8        | 45.3      | 57.5       |         |
| Emergency                                         | 1.4         | 0.9       | 2.6        |         |
| Weight of intervention (%)                        |             |           |            | 0.091   |
| Isolated CAGB                                     | 68.9        | 67.1      | 73.4       |         |
| Single non CAGB                                   | 13.1        | 13.9      | 11.2       |         |
| 2 procedures                                      | 15.9        | 16.9      | 13.3       |         |
| 3 procedures                                      | 2.1         | 2.1       | 2.1        |         |
| Surgery on thoracic aorta (%)                     | 2.7         | 3.1       | 1.7        | 0.262   |
| **Intraoperative characteristics**                |             |           |            |         |
| Aortic cross-clamp (min)                          | 60 [42-83]  | 60 [41-84.25]| 61 [44-78] | 0.879   |
| ECC (min)                                         | 91 [63-118] | 90 [62.75-119]| 91 [65.5-116] | 0.908 |
| **Postoperative characteristics**                 |             |           |            |         |
| Infection (%)                                     | 5.2         | 4.5       | 6.9        | 0.176   |
| First detubation (hour)                           | 3.2 [2.5-4.7]| 3.2 [2.5-4.6]| 3.2 [2.6-4.9]| 0.485 |
| Re-sternotomy <30d (%)                            | 4.2         | 3.8       | 5.2        | 0.403   |
| ICU days (n)                                      | 1.0 [1.0-1.0]| 1.0 [1.0-1.0]| 1.0 [1.0-1.0]| 0.094 |
| ICU extended (%)                                  | 5.8         | 5.4       | 6.9        | 0.420   |
| CVA (%)                                           | 0.4         | 0.0       | 1.3        | 0.006*  |
| Readmission ICU (%)                               | 0.9         | 0.7       | 1.3        | 0.412   |
| Readmission <30 days after discharge (%)          | 0.9         | 0.9       | 0.9        | 0.962   |
| MI (excl. perioperative MI) (%)                   | 0.7         | 0.5       | 1.3        | 0.938   |
| MI (incl. Perioperative MI) (%)                   | 3.0         | 2.4       | 4.3        | 0.215   |
| PCI <1yr. (%)                                     | 2.2         | 1.7       | 3.4        | 0.140   |

Abbreviations: R, recovery group; NR, non-recovery group; CVA, cerebral vascular accident; AP, angina pectoris; EuroSCORE, European System for Cardiac Operative Risk Evaluation; NYHA, New York Heart Association; CCS Class 4 Angina, Inability to perform any activity without angina or angina at rest; LVEF, left ventricular ejection fraction; MI, Myocardial infarction; CAGB, coronary artery bypass grafting; ECC, extracorporeal circulation; ICU, intensive care unit; PCI, percutaneous coronary intervention; *Indicates a significant difference across groups. Data are presented as median [interquartile range] unless stated otherwise.
**ESM Table 2.** Multivariate analysis of all cardiac surgery patients. **Dependent variable: mental recovery.**

|                                      | p-value | OR  | 95% CI         |
|--------------------------------------|---------|-----|----------------|
| Baseline SF36 mental domain score    | <0.001  | 0.953 | 0.943-0.963    |
| Recent MI                            | 0.006   | 0.587 | 0.402-0.856    |
| Infection                            | 0.027   | 0.452 | 0.224-0.914    |
| PCI < 1 year                          | 0.017   | 0.270 | 0.092-0.793    |

Hosmer and Lemeshow $X^2=13.889$, $p=0.085$; Nagelkerke $R^2=0.192$
### ESM Table 3. Characteristics of isolated CABG patients in the mental recovery group and non-recovery group

|                          | All (n=553) | R (n=381) | NR (n=172) | p-value |
|--------------------------|-------------|-----------|------------|---------|
| **Demographics**         |             |           |            |         |
| Baseline SF 36 mental domain score | 70 [55-82]  | 66 [52-77] | 79 [65-90] | <0.001* |
| Body Mass Index (kg/m²)  | 27.1 [24.8-29.6] | 26.9 [24.8-29.4] | 27.4 [24.8-29.7] | 0.512   |
| **Comorbidities**        |             |           |            |         |
| CVA (%)                  | 0.7         | 0.8       | 0.6        | 0.791   |
| Neurologic dysfunction (%)| 1.1         | 1.0       | 1.2        | 0.906   |
| **Cardiac status**       |             |           |            |         |
| Unstable AP (%)          | 4.9         | 4.7       | 5.2        | 0.400   |
| EuroSCORE II             | 1.37 [0.98-2.11] | 1.3 [0.9-2.0] | 1.5 [1.1-2.5] | 0.537   |
| Age (years)              | 68.4 [61.8-74.1] | 68.6 [61.9-74.3] | 68.3 [61.8-73.8] | 0.574   |
| Gender male (%)          | 83.2        | 85.8      | 77.3       | 0.013*  |
| **Serum Creatinine (umol/l)** | 84.0 [74.5-95.0] | 85.0 [76.0-94.5] | 82.0 [72.0-96.0] | 0.150   |
| Exacardiac arteriopathy (%) | 7.8        | 7.1       | 9.3        | 0.368   |
| Poor Mobility (%)        | 1.1         | 1.0       | 1.2        | 0.906   |
| Previous cardiac surgery (%) | 1.4         | 1.0       | 2.3        | 0.245   |
| Chronic lung Disease (%) | 10.1        | 10.8      | 8.7        | 0.462   |
| Active endocarditis (%)  | 0.0         | 0.0       | 0.0        | 1.000   |
| Critical preoperative state (%) | 0.5       | 0.5       | 0.6        | 0.933   |
| Diabetes (%)             | 19.7        | 18.9      | 21.5       | 0.475   |
| NYHA Class III or IV (%) | 57.1        | 54.1      | 64.0       | 0.030   |
| Angina CCS Class IV (%)  | 2.4         | 2.4       | 2.3        | 0.979   |
| LVEF (%)                 |             |           |            |         |
| Good                     | 79.7        | 80.1      | 76.2       | 0.448   |
| Moderate                 | 17.6        | 16.3      | 19.8       |         |
| Poor                     | 2.7         | 2.4       | 3.5        |         |
| missing                  | 1.3         | 1.3       | 0.6        |         |
| Recent MI (%)            | 29.5        | 24.4      | 40.7       | <0.001* |
| Pulmonary hypertension (%)| 1.8        | 2.1       | 1.2        | 0.444   |
| Urgency (%)              |             |           |            | 0.007*  |
| Elective                 | 38.5        | 42.5      | 29.7       |         |
| Urgent                   | 59.9        | 56.4      | 67.4       |         |
| Emergency                | 1.6         | 1.0       | 2.9        |         |
| Weight of intervention (%)|            |           |            | 0.795   |
| Isolated CABG            | 99.3        | 99.2      | 99.4       |         |
| Single non CABG          | 0.0         | 0.0       | 0.0        |         |
| 2 procedures             | 0.5         | 0.5       | 0.6        |         |
| 3 procedures             | 0.2         | 0.3       | 0.0        |         |
| Surgery thoracic. Aorta (%)| 0.2        | 0.0       | 0.6        | 0.137   |
| **Intraoperative characteristics** |     |           |            |         |
| Aortic cross-clamp (min) | 51.0 [37.0-70.0] | 50.0 [36.0-69.5] | 52.0 [39.0-71.0] | 0.252   |
| ECC (min)                | 80.0 [55.0-103.0] | 78.0 [53.0-103.0] | 84.0 [57.0-105.0] | 0.154   |
| **Postoperative characteristics** |     |           |            |         |
| Infection (%)            | 5.1         | 4.5       | 6.4        | 0.337   |
| First detubation (hour)  | 3.0 [2.5-4.4] | 3.08 [2.5-4.3] | 3.0 [2.6-4.5] | 0.634   |
| Re- sternotomy<30d (%)   | 3.8         | 4.2       | 2.9        | 0.746   |
| ICU days (n)             | 1.0 [1.0-1.0] | 1.0 [1.0-1.0] | 1.0 [1.0-1.0] | 0.850   |
| ICU stay extended (%)    | 1.5         | 2.6       | 2.9        | 0.850   |
| CVA (%)                  | 0.2         | 0.0       | 0.6        | 0.136   |
| Readmission ICU (%)      | 0.5         | 0.5       | 0.6        | 0.933   |
| Readmission <30 days after discharge (%) | 1.1        | 1.1       | 1.2        | 0.937   |
| MI (excl. perioperative) (%) | 1.1        | 0.6       | 2.0        | 0.376   |
| MI (incl. perioperative) (%) | 1.1        | 0.6       | 5.8        | 0.251   |
| PCI <1yr (%)             | 2.9         | 2.1       | 4.7        | 0.098   |

Abbreviations: R, recovery group; NR, non-recovery group; CVA, cerebral vascular accident; AP, angina pectoris; EuroSCORE, European System for Cardiac Operative Risk Evaluation; NYHA, New York Heart Association; CCS Class 4 Angina, Inability to perform any activity without angina or angina at rest; LVEF, left ventricular ejection fraction; MI, Myocardial infarction; CABG, coronary artery bypass grafting; ECC, extracorporeal circulation; ICU, intensive care unit; PCI, percutaneous coronary intervention; * indicates a significant difference across groups. Data are presented as median [interquartile range] unless stated otherwise.
**ESM Table 4. Multivariate analysis of isolated CABG patients. Dependent variable: mental recovery.**

|                          | p-value | OR      | 95% CI    |
|--------------------------|---------|---------|-----------|
| Baseline SF 36 domain score mental | <0.001  | 0.953   | 0.914-0.966 |
| Female sex               | <0.001  | 0.383   | 0.228-0.644 |
| Previous cardiac surgery | 0.028   | 0.185   | 0.041-0.838 |
| Recent MI                | 0.004   | 0.537   | 0.352-0.815 |
| PCI < 1 year             | 0.016   | 0.245   | 0.078-0.770 |

Hosmer and Lemeshow $X^2=7.939$, $p=0.439$; Nagelkerke $R^2=0.212$
**EMS Table 5. Characteristics of all cardiac surgery patients in the Responders and non-Responders group.**

| Characteristics             | Responders (n=803) | Non-Responders (n=970) | p-value |
|-----------------------------|--------------------|------------------------|---------|
| **Baseline characteristics**|                    |                        |         |
| Baseline SF 36 physical domain score | 59 [45-73]        |                        |         |
| Baseline SF 36 mental domain score | 68 [54-81]        |                        |         |
| Body Mass Index (kg/m²) | 27 [25-30]         | 27 [24-30]             | 0.685   |
| CVA (%)                     | 1.5                | 2.1                    | 0.372   |
| Neurologic dysfunction (%)  | 2.0                | 4.0                    | 0.014*  |
| Unstable AP (%)             | 3.5                | 5.3                    | 0.072   |
| **EuroSCORE II**            |                    |                        |         |
| Age (years)                 | 69 [62-75]         | 69 [62-76]             | 0.773   |
| Gender Male (%)             | 76.8               | 70.5                   | 0.003*  |
| Serum Creatinine (umol/l)   | 84 [73-96]         | 82 [71-97]             | 0.145   |
| Extracardiac arteriopathy (%) | 7.8                | 12.0                   | 0.004*  |
| Poor mobility (%)           | 2.0                | 4.0                    | 0.014*  |
| Previous cardiac surgery (%)| 3.1                | 3.9                    | 0.363   |
| Chronic lung disease (%)    | 11.5               | 12.4                   | 0.555   |
| Active endocarditis (%)     | 0.7                | 2.0                    | 0.031*  |
| Critical preoperative state (%) | 0.5              | 2.5                    | 0.001*  |
| Diabetes (%)                | 18.9               | 21.8                   | 0.143   |
| NYHA Class III or IV (%)    | 53.8               | 62.8                   | <0.001* |
| Angina CCS Class IV (%)     | 1.9                | 3.2                    | 0.080   |
| LVEF (%)                    | 0.016*             |                        |         |
| Good                        | 77.1               | 72.5                   |         |
| Moderate                    | 18.6               | 20.2                   |         |
| Poor                        | 4.4                | 7.3                    |         |
| Recent MI (%)               | 21.4               | 24.4                   | 0.134   |
| Pulmonary hypertension (%)  | 12.8               | 17.5                   | 0.006*  |
| Urgency (%)                 | <0.004*            |                        |         |
| Elective                    | 50.1               | 42.8                   |         |
| Urgent                      | 48.6               | 55.4                   |         |
| Emergency                   | 1.4                | 0.8                    |         |
| Weight of intervention (%)  |                    |                        | 0.092   |
| Isolated CABG               | 69.4               | 66.9                   |         |
| Single Non CABG             | 13.1               | 12.1                   |         |
| 2 Procedures                | 15.4               | 17.0                   |         |
| 3 Procedures                | 2.1                | 4.0                    |         |
| Surgery on thoracic aorta (%) | 2.7               | 3.8                    | 0.209   |
| **Intraoperative characteristics** |              |                        |         |
| Aortic cross-clamp (min)    | 60 [42-83]         | 60 [41-84]             | 0.641   |
| ECC (min)                   | 91 [64-118]        | 90 [64-120]            | 0.847   |
| **Postoperative characteristics** |              |                        |         |
| Infection (%)               | 5.6                | 7.1                    | 0.197   |
| First detubation (hour)     | 3.2 [2.5-4.7]      | 3.1 [2.5-4.6]          | 0.333   |
| Re-sternotomy <30 d (%)     | 4.1                | 7.3                    | 0.003*  |
| ICU days (n)                | 1.0 [1.0-1.0]      | 1.0 [1.0-1.0]          | 0.037*  |
| ICU stay extended (%)       | 6.0                | 10.6                   | <0.001* |
| CVA (%)                     | 0.2                | 1.0                    | 0.046*  |
| Readmission ICU (%)         | 1.0                | 2.1                    | 0.073   |
| Readmission <30days after discharge (%) | 1.1       | 2.0                    | 0.153   |
| MI (incl. perioperative MI) (valid%) | 3.4               | 4.5                    | 0.111   |
| MI (excl. perioperative MI) (valid%) | 0.9               | 1.2                    | 0.361   |
| PCI <1year (%)              | 2.2                | 3.0                    | 0.329   |

Abbreviations: CVA, cerebral vascular accident; AP, angina pectoris; EuroSCORE, European System for Cardiac Operative Risk Evaluation; NYHA, New York Heart Association; CCS Class 4 Angina, Inability to perform any activity without angina or angina at rest; LVEF, left ventricular ejection fraction; MI, Myocardial infarction; CABG, coronary artery bypass grafting; ECC, extracorporeal circulation; ICU, intensive care unit; PCI, percutaneous coronary intervention; *Indicates a significant difference across groups. Data are presented as median [interquartile range] unless stated otherwise.
ESM Figure 1. Flow chart of CABG patients.
ESM Figure 2. Venn diagram of all patients. Interplay between changes in SF-36 physical and mental domain scores prior to and 1 year after surgery (%).
ESM Figure 3. Venn diagram of isolated CABG patients. Interplay between changes in SF-36 physical and mental domain scores prior to and 1 year after surgery.