# **Magnusson Paper Notes for Binary Outcome(Y) [With Covariates]**

Model Y:

where is a mixture of two Bernoulli probabilities, defined as follows:

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Code notation |  |  |

In the table above . Namely:

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Code notation: | theta0[i,j] | theta1[i,j] |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | where | where | where | where |
| Code notation: | pi1[i] | pi2[i] | pi3[i] | pi4[i] |

Model S:

A math equations and formulas

Description automatically generated with medium confidence

For each subject i:

|  |  |
| --- | --- |
|  | Code notation : |
|  | p1[i] = pi1[i] + pi2[i] |
|  | P0[i] = pi2[i] + pi4[i] |

ACE Calculation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | ACE Calculation |
|  | observed | S1[i] ~ dbern(p1[i]) | observed | Y1[i] ~ dbern() | Strata Membership defined by  Within each stratum, compute the Odds Ratio of Y=1 vs Y=0 |
|  | observed | S1[i] ~ dbern(p1[i]) | Y0[i] ~ dbern() | observed |
|  | S0[i] ~ dbern(p0[i]) | Observed | observed | Y1[i] ~ dbern() |
|  | S0[i] ~ dbern(p0[i]) | Observed | Y0[i] ~ dbern() | observed |

**R Coding Process:**

* Compute  **matrix** (indicate possible strata membership for each subject

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strata | H | D | I | B |
|  | 1 | 0 | 1 | 0 |
|  | 0 | 0 | 1 | 1 |
|  | 0 | 1 | 0 | 1 |
|  | 1 | 1 | 0 | 0 |
| Code notation | I[i, 1] | I[i, 2] | I[i, 3] | I[i, 4] |

* Compute

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | H | D | I | B |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | Where | | | |
| Code notation | expa[i,1] | expa[i,2] | expa[i,3] | expa[i,4] | pi1[i] | pi2[i] | pi3[i] | pi4[i] |

* Compute mixture-weight probabilities **w[i,j]**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S,Z | expa[i,j] \* I[i,j] | | | | pi[i] \* I[i,j] | | | | Mixture weight prob = | | | |
| 0,0 |  | 0 |  | 0 |  | 0 |  | 0 |  | 0 |  | 0 |
| 0,1 | 0 | 0 |  |  | 0 | 0 |  |  | 0 | 0 |  |  |
| 1,0 | 0 |  | 0 |  | 0 |  | 0 |  | 0 |  | 0 |  |
| 1,1 |  |  | 0 | 0 |  |  | 0 | 0 |  |  | 0 | 0 |
|  |  | | | | where | | | | where | | | |
| Code notation |  |  |  |  |  |  |  |  | w[i,1] | w[i,2] | w[i,3] | w[i,4] |

* Compute

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | theta0[i,1]  +  delta[1] | theta0[i,2]  +  delta[2] | theta0[i,3]  +  delta[3] | theta0[i,4]  +  delta[4] |
| Code notation | theta0[i,1] | theta0[i,2] | theta0[i,3] | theta0[i,4] | theta1[i,1] | theta1[i,2] | theta1[i,3] | theta1[i,4] |

* **Compute**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Expit[i,j] | | | | mix components | | | |  |
|  |  |  |  |  | Expit0[i,1]  \*  w[i,1] | Expit0[i,2]  \*  w[i,2] | Expit0[i,3]  \*  w[i,3] | Expit0[i,4]  \*  w[i,4] | Sum(wexpit0[i,]) |
| Code notation | expit0[i,1] | expit0[i,2] | expit0[i,3] | expit0[i,4] | wexpit0[i,1] | wexpit0[i,2] | wexpit0[i,3] | wexpit0[i,4] | wexpit0\_mix |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Expit[i,j] | | | | mix components | | | |  |
|  |  |  |  |  | Expit1[i,1]  \*  w[i,1] | Expit1[i,2]  \*  w[i,2] | Expit1[i,3]  \*  w[i,3] | Expit1[i,4]  \*  w[i,4] | Sum(wexpit1[i,]) |
| Code notation | Expit1[i,1] | Expit1[i,2] | Expit1[i,3] | Expit1[i,4] | Wexpit1[i,1] | Wexpit1[i,2] | Wexpit1[i,3] | Wexpit1[i,4] | Wexpit1\_mix |