PBL Effect ⇒ composition effect + effect of interest

<Treatment>

		Post			
Pre	N	P_{NN}^T	P_{NR}^T	P_{NG}^T	P_{NM}^T
	R			:	
	G			:	
	M			·	

<Control>

		Post			
Pre	N	P_{NN}^C	P_{NR}^C	P_{NG}^C	P_{NM}^C
	R			:	
	G			:	
	M			·	

where $P_{ij} = ($ Dyadic Relation$_{t=1} = j \mid$ Dyadic Relation$_{t=0} = i)$

Treatment effect for Pre-Null relationship

$\overset{(*)}{=} \rho_N$

$= \sum_j P_{Nj}^T \left(E(y_{i1} \mid X_{i1}=j, T, X_{i0}=N) - E(y_{i0} \mid X_{i1}=j, T, X_{i0}=N) \right)$

$\quad - \sum_j P_{Nj}^C \left(E(y_{i1} \mid X_{i1}=j, C, X_{i0}=N) - E(y_{i0} \mid X_{i1}=j, C, X_{i0}=N) \right)$

$\qquad \overset{\parallel}{P_{Nj}^T} - P_{Nj}^T + P_{Nj}^C$

$= \sum_j P_{Nj}^T \left(E(y_{i1} \mid X_{i1}=j, T, X_{i0}=N) - E(y_{i0} \mid X_{i1}=j, T, X_{i0}=N) \right.$

$\qquad \left. - \left(E(y_{i1} \mid X_{i1}=j, C, X_{i0}=N) - E(y_{i0} \mid X_{i1}=j, C, X_{i0}=N) \right) \right) \Big\}$ effect of interest

$\quad + \sum_j (P_{Nj}^T - P_{Nj}^C) \left(E(y_{i1} \mid X_{i1}=j, C, X_{i0}=N) - E(y_{i0} \mid X_{i1}=j, C, X_{i0}=N) \right)$

$\underbrace{\text{diff in transition}} \qquad\qquad \underbrace{\text{learning by each group in control}}$

(*) $y_{it} = \beta_0 + \beta_1 t_i + \beta_2 t_i PBL_i + \sum_{j \neq N} \delta_j X_{i0j} + \sum_j \gamma_j X_{i0j} \cdot t_i + \sum_j d_j X_{i0j} \cdot PBL_i$

$\qquad + \sum_j \rho_j X_{i0j} \cdot PBL_i \cdot t_i$

$\rho_N = E(y_{i1} \mid PBL=1, X_{i0j}=N) - E(y_{i0} \mid PBL=1, X_{i0j}=N)$

$\qquad - \left(E(y_{i1} \mid PBL=0, X_{i0j}=N) - E(y_{i0} \mid PBL=0, X_{i0j}=N) \right)$

↳ whole sample에 대한 transition mtx로 재생되는 것이 아님