

# The 64 causal types in a mediation model

In a  $X \rightarrow M \rightarrow Y \leftarrow X$  model in which  $X$  can affect  $Y$  directly or indirectly through  $M$ , all nodes binary, there are:

- 4 types for  $M$  (4 ways that  $M$ 's values could be determined, given  $X$ )
- 16 types for  $Y$  (16 ways that  $Y$ 's values could be determined, given  $X$  and  $M$ )
- 64 distinct causal types, capturing all the different ways that  $X$  could cause  $Y$  directly or indirectly through  $M$

The table below shows all 64 types and how to interpret them.

Y when					M when				
						M.00	M.01	M.10	M.11
					X = 0	0	0	1	1
					X = 1	0	1	0	1
	X = 0, M = 0	X = 1, M = 0	X = 0, M = 1	X = 1, M = 1					
Y.0000	0	0	0	0		1	2	3	4
Y.1000	1	0	0	0		5	6	7	8
Y.0100	0	1	0	0		9	10	11	12
Y.1100	1	1	0	0		13	14	15	16
Y.0010	0	0	1	0		17	18	19	20
Y.1010	1	0	1	0		21	22	23	24
Y.0110	0	1	1	0		25	26	27	28
Y.1110	1	1	1	0		29	30	31	32
Y.0001	0	0	0	1		33	34	35	36
Y.1001	1	0	0	1		37	38	39	40
Y.0101	0	1	0	1		41	42	43	44
Y.1101	1	1	0	1		45	46	47	48
Y.0011	0	0	1	1		49	50	51	52
Y.1011	1	0	1	1		53	54	55	56
Y.0111	0	1	1	1		57	58	59	60
Y.1111	1	1	1	1		61	62	63	64