

## Learning Faithful Representations of Causal Graphs

### Appendix

- 100 randomly sampled word pairs annotated with cause/non-cause, associative/non-associative, their normalized cosine-similarity distance and causal quasi-pseudo metric, type of causal link (mediator, collider, confounder or direct).

cause	effect	Cosine similarity	Quasi-pseudo distance	Cause/Non-cause	Type of Causal Link	Associative/Non-associative
thunderstorm	tornado	0.0178	0.4346	cause	Direct	Associative
uncertainty	diplomacy	0.8523	0.8813	non-cause		Non-Associative
communist	television	0.6568	0.9377	non-cause		Non-Associative
liver disease	heart disease	0.4343	0.8355	non-cause		Associative
economic recovery	minimalism	0.8126	0.8096	non-cause		Non-Associative
shortage	earthquake	0.3891	0.6811	non-cause		Associative
maze	unfamiliar	0.4077	0.5699	non-cause		Associative
coverage	winning goal	0.4122	0.6464	non-cause		Associative
panic attack	sweat	0.1259	0.3235	cause	Confounder	Associative
smoking	heart disease	0.9008	0.2306	cause	Direct	Non-Associative
bacteria	notoriety	0.6179	0.6156	non-cause		Non-Associative
sweeping sanction	struggle	0.9219	0.3353	cause	Direct	Non-Associative
decline	vacancy	0.2287	0.5717	non-cause		Associative
earthquake	spring	0.8100	0.7985	non-cause		Non-Associative
short circuit	fire	0.8369	0.1874	cause	Direct	Non-Associative
disorder	divisiveness	0.1282	0.5702	non-cause		Associative
investigation	criminal charge	0.5107	0.3095	cause	Mediator	Non-Associative
robbery	arrest	0.4534	0.4592	cause	Mediator	Non-Associative
broken motor	car shake	0.5082	0.2477	cause	Mediator	Associative
chemical process	backlash	0.8625	0.9065	non-cause		Non-Associative
greed	successful	0.0960	0.6225	non-cause		Associative

devaluation	loss	0.1625	0.6602	non-cause		Associative
parvo	dog death	0.4561	0.4702	cause	Direct	Non-Associative
anemic	economy	0.9794	0.9042	non-cause		Non-Associative
heart condition	palpitations	0.8730	0.2398	cause	Direct	Non-Associative
damaged nasal cells	nosebleed	0.1875	0.2910	cause	Collider	Associative
asthma	cough	0.1730	0.4070	cause	Collider	Associative
outbreak	industry	0.7005	0.6517	non-cause		Non-Associative
anxiety	indigestion	0.2557	0.4329	cause	Confounder	Associative
obesity	diabetes	0.4180	0.2394	cause	Mediator	Associative
asbestos	federal law	0.8558	0.5210	non-cause		Non-Associative
injury	extinction	0.6150	0.5849	non-cause		Non-Associative
rain	flood	0.3725	0.2473	cause	Direct	Associative
burn	quake	0.8926	0.7836	non-cause		Non-Associative
disease	playoff	0.5687	0.5811	non-cause		Non-Associative
epidemic	evacuation	0.7329	0.1248	cause	Mediator	Non-Associative
poor circulation	budget	0.7197	0.6649	non-cause		Non-Associative
auto immune	recurrent miscarriage	0.6965	0.2556	cause	Mediator	Non-Associative
panic attack	adrenaline	0.3716	0.0317	cause	Confounder	Associative
liver problem	nosebleed	0.1144	0.2016	cause	Collider	Associative
tax break	billion dollar	0.1172	0.9919	non-cause		Associative
hunger	headache	0.1971	0.2683	cause	Collider	Associative
thrombosis	leg swelling	0.1658	0.2673	cause	Direct	Associative
possible litigation	military operation	0.8692	0.5618	non-cause		Non-Associative
vandal	derailment	0.5540	0.3861	cause	Direct	Non-Associative
election	inquiry	0.1467	0.7978	non-cause		Associative
conspiracy	assassination	0.8611	0.5286	cause	Mediator	Non-Associative
victory	conflict	0.1638	0.9503	non-cause		Associative

death	obesity	0.4708	0.8513	non-cause		Associative
low sugar	headache	0.3685	0.1078	cause	Collider	Associative
war	epidemic	0.6825	0.2304	cause	Mediator	Non-Associative
gravity	universe	0.3964	0.6110	non-cause		Associative
dry air	nosebleed	0.0663	0.3019	cause	Collider	Associative
garlic	bad breath	0.8685	0.4107	cause	Direct	Non-Associative
sugar binge	serotonin	0.8538	0.1651	cause	Direct	Non-Associative
monetary benefit	penalty	0.6035	0.5709	non-cause		Non-Associative
shortage	year end	0.2454	0.8272	non-cause		Associative
inhibition	newspapers report	0.8886	0.5458	non-cause		Non-Associative
addiction	cognitive damage	0.7802	0.3488	cause	Direct	Non-Associative
accident	fog	0.4508	0.7619	non-cause		Associative
purchase	anxiety	0.4909	0.9981	non-cause		Associative
uninspiring	party	0.9238	0.7355	non-cause		Non-Associative
scandal	major shakeup	0.6459	0.4072	cause	Mediator	Non-Associative
smoking	cough	0.3193	0.0174	cause	Collider	Associative
sexual	temporary	0.5124	0.8707	non-cause		Non-Associative
smoking	cancer	0.1972	0.0227	cause	Direct	Associative
blindness	lawsuit	0.9019	0.7790	non-cause		Non-Associative
federal law	state constitution	0.6052	0.9261	non-cause		Non-Associative
unexploded powder	unfortunate incident	0.5644	0.5688	cause	Mediator	Non-Associative
high sugar	headache	0.3392	0.1875	cause	Collider	Associative
wind shear	accident	0.7557	0.3802	cause	Mediator	Non-Associative
disease	poverty	0.5478	0.8196	non-cause		Associative
hamburger	food poisoning	0.4937	0.3436	cause	Confounder	Non-Associative
transaction	stock price	0.4866	0.7365	non-cause		Associative
high pressure	thunderstorm	0.0285	0.2220	cause	Mediator	Associative

plaque	mouth ulcer	0.6121	0.3394	cause	Direct	Non-Associative
stress	headache	0.1359	0.2473	cause	Collider	Associative
higher oil price	fall demand	0.9138	0.4450	cause	Mediator	Non-Associative
hurricane	insurance	0.6344	0.5987	cause	Confounder	Non-Associative
imbalance	billion dollar	0.9167	0.8807	non-cause		Non-Associative
molten rock	earth heat	0.4772	0.4632	cause	Mediator	Associative
economic recovery	surge in revenues	0.8087	0.3439	cause	Direct	Non-Associative
high demand	increase in gas price	0.0648	0.0355	cause	Collider	Associative
federal law	industry	0.1381	0.5544	non-cause		Associative
panic attack	economic crisis	0.5361	0.6455	non-cause		Associative
world series	spike	0.8239	0.9279	non-cause		Non-Associative
anxiety	insomnia	0.3526	0.1346	cause	Confounder	Associative
dust	nosebleed	0.2545	0.3258	cause	Collider	Associative
investigation	security	0.5350	0.8449	non-cause		Associative
snow	infant mortality	0.9181	0.1446	cause	Mediator	Non-Associative
repeat	fatigue	0.7990	0.1801	cause	Direct	Non-Associative
tragedy	counterfeiting	0.6378	0.8632	non-cause		Non-Associative
mood swing	drugs	0.5254	0.5255	non-cause		Associative
virus	bacteria	0.5233	0.6511	non-cause		Associative
drought	water shortage	0.3826	0.3292	cause	Direct	Associative
ill-conceived	swarming tactic	0.6822	0.5362	non-cause		Non-Associative
voting	lawsuit	0.4700	0.5619	non-cause		Associative
off-season weight gain	holiday	0.3917	0.8618	non-cause		Associative
low supply	increase in gas price	0.3957	0.2012	cause	Collider	Associative
infuse	fresh	0.8870	0.7241	non-cause		Non-Associative