

## 7 Supplementary Material

### 7.1 ImageNet-E

In Table 9, we report both the drop in accuracy and the absolute accuracy for the fully supervised ResNet-50 network and the self-supervised SimCLR [4] method.

Table 9: ImageNet-E: (a) Drop of Top1 accuracy (Lower is better) and (b) Absolute Accuracy (Higher is better) under background changes, size changes, random position (rp), random direction (rd) categories. Results for ResNet50 are reported from MPD [5].

(a) Drop of Accuracy												
Models	Original	Background changes				Size changes				Position	Direction	
		Inver	$\lambda = -20$	$\lambda = 20$	$\lambda = 20$ -adv	Random	Full	0.10	0.08	0.05	rp	rd
standard ResNet50	92.69	1.97	7.30	13.35	29.92	13.34	2.71	7.25	10.51	21.26	26.46	25.12
LCM (ResNet50)	92.60	1.72	6.70	11.55	29.95	13.64	3.20	6.08	8.7	18.54	23.58	22.92
LCM+SimCLR (ResNet50)	92.55	1.40	7.36	12.23	31.53	14.15	2.96	6.84	10.57	20.55	24.23	23.39

  

(b) Absolute Accuracy												
Models	Original	Background changes				Size changes				Position	Direction	
		Inver	$\lambda = -20$	$\lambda = 20$	$\lambda = 20$ -adv	Random	Full	0.10	0.08	0.05	rp	rd
standard ResNet50	92.69	90.72	85.39	79.34	62.77	79.35	89.98	85.44	82.18	71.43	66.23	67.57
LCM (ResNet50)	92.60	90.88	85.90	81.05	62.65	78.96	89.40	86.52	83.90	74.06	69.02	69.68
LCM+SimCLR (ResNet50)	92.55	91.15	85.19	80.32	61.02	78.40	89.59	85.71	81.98	72.00	68.32	69.16

### 7.2 ImageNet-X

Following the detailed results in Table 10, it is evident that LCM-trained fully supervised ImageNet weights and self-supervised ImageNet weights offer better accuracies than the standard weights. Notably, LCM-trained weights demonstrate better or more competitive performance when compared to MPD-trained ImageNet weights.

Table 10: ImageNet-X: error ratios comparisons for MPD and LCM. Error ratios close to 1.0 is ideal robustness for each factor. LCM demonstrate consistent robustness compared to standard ResNet50 model and matches the performance with MPD in supervised and self-supervised approaches.

Factor	Supervised				Self-supervised	
	Standard	ResNet50	MPD	LCM	MPD+SimCLR	LCM+SimCLR
pose	0.70	0.72	0.73	0.74	0.72	0.72
pattern	0.77	0.89	0.81	0.78	0.82	0.82
partial.view	1.13	0.89	0.86	0.86	0.87	0.87
background	1.14	1.08	1.10	1.09	1.11	1.11
brighter	1.17	1.09	1.10	1.09	1.09	1.09
color	1.19	1.21	1.17	1.18	1.16	1.16
larger	1.32	1.30	1.24	1.22	1.24	1.24
smaller	1.50	1.44	1.51	1.50	1.51	1.51
darker	1.72	1.52	1.50	1.51	1.52	1.52
shape	1.75	1.63	1.64	1.61	1.59	1.59
object_blocking	1.92	1.66	1.62	1.61	1.60	1.60
style	1.93	1.73	1.75	1.63	1.68	1.68
multiple_objects	1.97	1.76	1.72	1.72	1.69	1.69
subcategory	2.10	1.92	1.94	1.90	1.84	1.84
person_blocking	2.17	1.95	1.98	1.97	2.10	2.10
texture	2.39	2.20	2.24	2.18	2.20	2.20
Average	1.55	1.44	<b>1.43</b>	1.41	1.42	1.42