

Table R1: Performance comparison on Cora and Citeseer datasets for GCIL setting. Results are averaged among three trials. The best performing results (excluding Joint) are highlighted in **bold**.

Method	Cora		Citeseer	
	Equally (2)		Equally (2)	
	AP $\uparrow$	AF $\uparrow$	AP $\uparrow$	AF $\uparrow$
Finetuning	32.58 $\pm$ 0.00	-96.83 $\pm$ 0.39	31.46 $\pm$ 0.27	-77.86 $\pm$ 0.67
EWC	32.58 $\pm$ 0.00	-97.16 $\pm$ 0.55	31.26 $\pm$ 0.15	-78.22 $\pm$ 0.61
GEM	32.70 $\pm$ 0.19	-97.12 $\pm$ 0.16	31.39 $\pm$ 0.09	-77.70 $\pm$ 1.06
MAS	31.84 $\pm$ 0.10	-97.17 $\pm$ 0.22	31.25 $\pm$ 0.55	-76.67 $\pm$ 1.18
LwF	32.58 $\pm$ 0.00	-97.57 $\pm$ 0.27	31.44 $\pm$ 0.00	-78.29 $\pm$ 0.36
TWP	32.58 $\pm$ 0.00	-97.32 $\pm$ 0.17	31.22 $\pm$ 0.23	-78.14 $\pm$ 0.22
SSRM	35.48 $\pm$ 0.49	-70.01 $\pm$ 1.12	51.91 $\pm$ 4.59	-67.66 $\pm$ 6.67
ERGNN	65.48 $\pm$ 0.76	-46.09 $\pm$ 1.15	47.65 $\pm$ 0.57	-51.12 $\pm$ 1.47
+GSIP	71.29 $\pm$ 0.91	-36.95 $\pm$ 1.22	61.29 $\pm$ 0.96	-29.38 $\pm$ 2.28
Improve $\uparrow$	5.81	9.14	13.64	21.74
SSM	67.64 $\pm$ 3.14	-19.78 $\pm$ 8.10	60.99 $\pm$ 1.43	-13.60 $\pm$ 3.61
+GSIP	69.92 $\pm$ 1.46	-11.82 $\pm$ 6.74	61.86 $\pm$ 2.23	-8.39$\pm$3.82
Improve $\uparrow$	2.28	7.96	0.87	5.21
CaT	88.22 $\pm$ 0.49	-4.40 $\pm$ 1.04	75.08 $\pm$ 0.35	-10.93 $\pm$ 1.07
+GSIP	89.60$\pm$0.62	1.84$\pm$3.89	77.02$\pm$0.70	-9.95 $\pm$ 1.15
Improve $\uparrow$	1.38	6.24	1.94	0.98
Joint	93.09 $\pm$ 0.85	-	78.27 $\pm$ 0.10	-

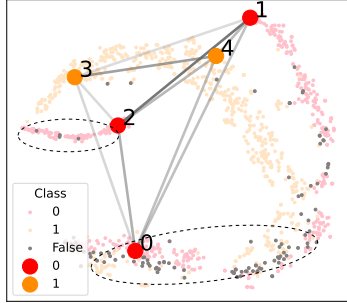


Figure R1: Visualizations of semantic shift.

Table R2: Hyperparameter setting of three methods on Cora-Full, Arxiv, and Reddit datasets.

	CoraFull	Arxiv	Reddit
U	[1e1, 5e-6, 1]	[1e1, 1e-2, 5e-6]	[1, 1e-3, 5e-6]
E(10)	[1e1, 1e-1, 1]	[5, 1e1, 1]	[1, 1e-2, 5e-7]
E(2)	[5e1, 1e-3, 2e-1]	[1e1, 5, 1e-7]	[1, 5e-4, 1e-3]
U	[1e-1, 1e1, 1e-6]	[1e-1, 1e1, 1e-2]	[1e-2, 5e-2, 1e-2]
E(10)	[1e-1, 1e1, 5e-7]	[1e-1, 1e1, 1e-3]	[1e-2, 5e-2, 1e-2]
E(2)	[1e-1, 1e1, 1e-6]	[1e-1, 1e1, 1e-7]	[1e-1, 5e2, 1e-2]
U	[1e-1, 1e1, 1]	[1e-1, 1e1, 5e-6]	[1e-1, 5e-6, 5e-4]
E(10)	[1e-1, 1e1, 1e2]	[1e-1, 1e1, 1e-5]	[5e-1, 2e1, 1e1]
E(2)	[1, 1, 1]	[5e-1, 2e1, 2e-5]	[5e-1, 2e-3, 2]

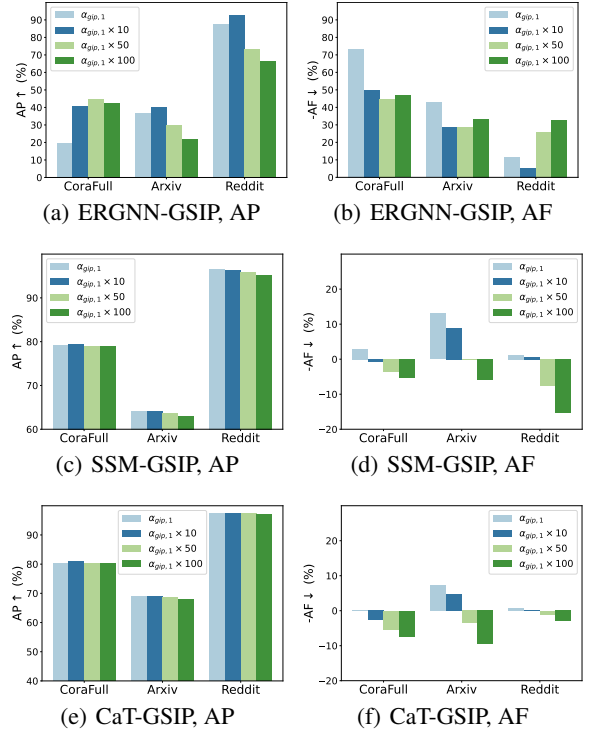


Figure R2: The analysis of α_{gip} in ERGNN-GSIP, SSM-GSIP, and CaT-GSIP on three datasets.

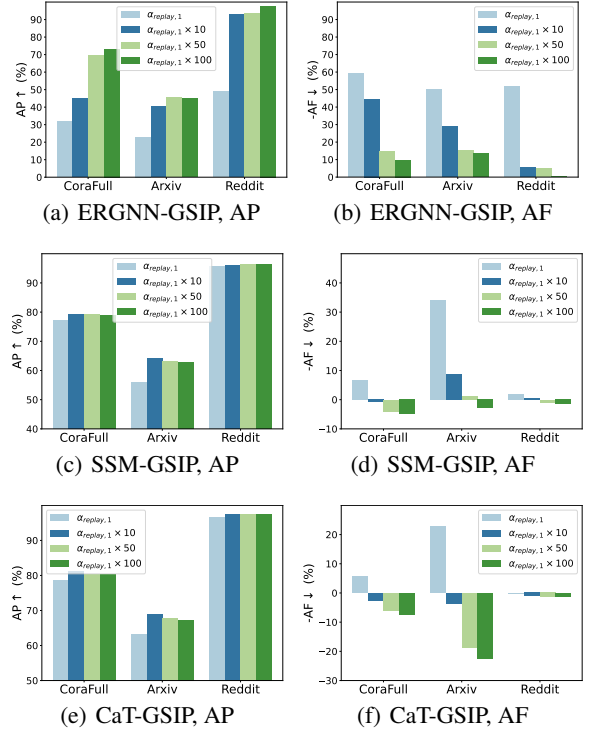


Figure R3: The analysis of α_{replay} in ERGNN-GSIP, SSM-GSIP, and CaT-GSIP on three datasets.