A Details of Experimental Setup

A.1 Code

Code is available at https://github.com/matsuolab/T3A.

A.2 Total amount of compute

We run our experiments mainly on cloud V100x4 or A100x8 instances, depending on the memory usage of the backbone networks. We used approximately 1500 hours for the v100x4 instances and 400 hours for the a100x8 instances. Note that the computational time was mainly consumed to reproduce prior results (training base models with ERM and CORAL). Our method only has negligible computational overhead, as mentioned in Section 3.2.

A.3 License of assets

Datasets VLCS is a combination of 4 datasets: Caltech101 (unspecified), PASCAL VOC (Flicks terms of use), LabelME (unspecified) and SUN09 (unspecified). PACS is a combination of several sources: Caltech256 (unspecified), Sketchy (Apache-2.0 for the download script, dataset unspecified), TU-Berlin (CC BY 4.0) and Google Images (unspecified). OfficeHome (non-commercial research and educational purposes). TerraIncognita (CDLA-Permissive-1.0).

Codes `DomainBed` (MIT License), `torch-vision` for ResNet18 and ResNet50 (Apache-2.0), the official repository of Big Transfer (Apache-2.0), `timm` for Vision Transformer and MLP-Mixer (Apache-2.0), and the official repository of Tent (MIT License).

A.4 Hyperparameters

Following [52], we conduct a random search of 20 trials over a joint distribution of all hyperparameters. Namely, for both ERM and CORAL, learning rate is selected from $10^{\text{Uniform(-5, -3.5)}}$, batch size is selected from $2^{\text{Uniform(3, 5.5)}}$, dropout rate is selected from $[0, 0.1, 0.5]$, and weight decay is selected from $10^{\text{Uniform(-6, -2)}}$.

A.5 Trial seeds

For the results of Table 1 and Figure 2, we used three seeds $\{0, 1, 2\}$ in `DomainNet` library, which is the same with the original paper. For the results of Table 2 we used three seeds $\{10, 11, 12\}$ as well.

B Full Results

This section contains the full results of the entire experiment—for example, Appendix B.1 shows the full results of Table 1 per dataset and domain. Please refer to the main text for the detailed notation of each chart.

B.1 Full Results for Table 1

Algorithm	C	L	S	V	Avg
ERM	97.7 ± 0.4	64.3 ± 0.9	73.4 ± 0.5	74.6 ± 1.3	77.5
IRM	98.6 ± 0.1	64.9 ± 0.9	73.4 ± 0.6	77.3 ± 0.9	78.5
GroupDRO	97.3 ± 0.3	63.4 ± 0.9	69.5 ± 0.8	76.7 ± 0.7	76.7
Mixup	98.3 ± 0.6	64.8 ± 1.0	72.1 ± 0.5	74.3 ± 0.8	77.4
MLDG	97.4 ± 0.2	65.2 ± 0.7	71.0 ± 1.4	75.3 ± 1.0	77.2
CORAL	98.3 ± 0.1	66.1 ± 1.2	73.4 ± 0.3	77.5 ± 1.2	78.8
MMD	97.7 ± 0.1	64.0 ± 1.1	72.8 ± 0.2	75.3 ± 3.3	77.5
DANN	99.0 ± 0.3	65.1 ± 1.4	73.1 ± 0.3	77.2 ± 0.6	78.6
CDANN	97.1 ± 0.3	65.1 ± 1.2	70.7 ± 0.8	77.1 ± 1.5	77.5
MTL	97.8 ± 0.4	64.3 ± 0.3	71.5 ± 0.7	75.3 ± 1.7	77.2
SagNet	97.9 ± 0.4	64.5 ± 0.5	71.4 ± 1.3	77.5 ± 0.5	77.8
ARM	98.7 ± 0.2	63.6 ± 0.7	71.3 ± 1.2	76.7 ± 0.6	77.6
VREx	98.4 ± 0.3	64.4 ± 1.4	74.1 ± 0.4	76.2 ± 1.3	78.3
RSC	97.9 ± 0.1	62.5 ± 0.7	72.3 ± 1.2	75.6 ± 0.8	77.1
ERM**	97.7 ± 0.1	64.1 ± 0.8	72.5 ± 0.9	76.7 ± 0.5	77.7
+T3A	**99.1 ± 0.4**	**67.5 ± 0.6**	**76.8 ± 1.2**	76.6 ± 0.3	**80.0**
+Tent-BN	83.3 ± 2.0	60.7 ± 0.2	61.7 ± 1.1	67.2 ± 0.8	68.2
+Tent-C	**97.8 ± 0.2**	**64.3 ± 1.0**	68.3 ± 0.8	**77.5 ± 0.2**	77.0
CORAL**	97.6 ± 0.2	65.1 ± 0.8	73.7 ± 1.0	78.0 ± 0.2	78.6
+T3A	**98.9 ± 0.2**	**67.1 ± 1.0**	**75.2 ± 1.3**	76.9 ± 0.6	**79.5**
+Tent-BN	87.1 ± 0.3	60.4 ± 1.7	67.8 ± 0.7	70.3 ± 0.6	71.4
+Tent-C	97.4 ± 0.2	64.7 ± 1.0	72.1 ± 0.7	**78.3 ± 0.2**	78.1

Table 4: Full results for Table 1 on VLCS.

Algorithm	A	C	P	S	Avg
ERM	84.7 ± 0.4	80.8 ± 0.6	97.2 ± 0.3	79.3 ± 1.0	85.5
IRM	84.8 ± 1.3	76.4 ± 1.1	96.7 ± 0.6	76.1 ± 1.0	83.5
GroupDRO	83.5 ± 0.9	79.1 ± 0.6	96.7 ± 0.3	78.3 ± 2.0	84.4
Mixup	86.1 ± 0.5	78.9 ± 0.8	97.6 ± 0.1	75.8 ± 1.8	84.6
MLDG	85.5 ± 1.4	80.1 ± 1.7	97.4 ± 0.3	76.6 ± 1.1	84.9
CORAL	88.3 ± 0.2	80.0 ± 0.5	97.5 ± 0.3	78.8 ± 1.3	86.2
MMD	86.1 ± 1.4	79.4 ± 0.9	96.6 ± 0.2	76.5 ± 0.5	84.6
DANN	86.4 ± 0.8	77.4 ± 0.8	97.3 ± 0.4	73.5 ± 2.3	83.6
CDANN	84.6 ± 1.8	75.5 ± 0.9	96.8 ± 0.3	73.5 ± 0.6	82.6
MTL	87.5 ± 0.8	77.1 ± 0.5	96.4 ± 0.8	77.3 ± 1.8	84.6
SagNet	87.4 ± 1.0	80.7 ± 0.6	97.1 ± 0.1	80.0 ± 0.4	86.3
ARM	86.8 ± 0.6	76.8 ± 0.5	97.4 ± 0.3	79.3 ± 1.2	85.1
VREx	86.0 ± 1.6	79.1 ± 0.6	96.9 ± 0.5	77.7 ± 1.7	84.9
RSC	85.4 ± 0.8	79.7 ± 1.8	97.6 ± 0.3	78.2 ± 1.2	85.2
ERM**	85.0 ± 0.8	77.9 ± 2.0	97.1 ± 0.5	74.6 ± 1.6	83.6
+T3A	**86.3 ± 0.9**	**80.3 ± 0.9**	**97.5 ± 0.4**	**77.1 ± 1.4**	**85.3**
+Tent-BN	**86.3 ± 0.1**	**80.0 ± 0.9**	96.9 ± 0.3	**76.1 ± 1.0**	**84.8**
+Tent-C	84.9 ± 0.9	**78.2 ± 2.2**	97.1 ± 0.5	68.9 ± 3.5	82.3
CORAL**	86.6 ± 0.5	77.0 ± 1.0	97.6 ± 0.1	75.7 ± 1.3	84.2
+T3A	**87.7 ± 0.6**	**78.9 ± 0.6**	**97.8 ± 0.1**	**78.1 ± 0.8**	**85.6**
+Tent-BN	**87.9 ± 0.3**	**78.5 ± 0.7**	97.5 ± 0.1	**78.2 ± 0.3**	**85.6**
+Tent-C	**87.3 ± 1.0**	76.7 ± 1.2	97.6 ± 0.1	73.3 ± 2.6	83.7

Table 5: Full results for Table 1 on PACS.

Algorithm	A	C	P	R	Avg
ERM	61.3 ± 0.7	52.4 ± 0.3	75.8 ± 0.1	76.6 ± 0.3	66.5
IRM	58.9 ± 2.3	52.2 ± 1.6	72.1 ± 2.9	74.0 ± 2.5	64.3
GroupDRO	60.4 ± 0.7	52.7 ± 1.0	75.0 ± 0.7	76.0 ± 0.7	66.0
Mixup	62.4 ± 0.8	54.8 ± 0.6	76.9 ± 0.3	78.3 ± 0.2	68.1
MLDG	61.5 ± 0.9	53.2 ± 0.6	75.0 ± 1.2	77.5 ± 0.4	66.8
CORAL	65.3 ± 0.4	54.4 ± 0.5	76.5 ± 0.1	78.4 ± 0.5	68.7
MMD	60.4 ± 0.2	53.3 ± 0.3	74.3 ± 0.1	77.4 ± 0.6	66.3
DANN	59.9 ± 1.3	53.0 ± 0.3	73.6 ± 0.7	76.9 ± 0.5	65.9
CDANN	61.5 ± 1.4	50.4 ± 2.4	74.4 ± 0.9	76.6 ± 0.8	65.8
MTL	61.5 ± 0.7	52.4 ± 0.6	74.9 ± 0.4	76.8 ± 0.4	66.4
SagNet	63.4 ± 0.2	54.8 ± 0.4	75.8 ± 0.4	78.3 ± 0.3	68.1
ARM	58.9 ± 0.8	51.0 ± 0.5	74.1 ± 0.1	75.2 ± 0.3	64.8
VREx	60.7 ± 0.9	53.0 ± 0.9	75.3 ± 0.1	76.6 ± 0.5	66.4
RSC	60.7 ± 1.4	51.4 ± 0.3	74.8 ± 1.1	75.1 ± 1.3	65.5
ERM**	59.8 ± 0.3	53.9 ± 0.5	75.1 ± 0.2	76.8 ± 0.5	66.4
+T3A	**61.6 ± 0.1**	**56.0 ± 0.3**	**77.3 ± 0.2**	**78.2 ± 0.3**	**68.3**
+Tent-BN	**62.1 ± 0.4**	**55.1 ± 0.5**	74.6 ± 0.0	76.2 ± 0.6	**67.0**
+Tent-C	59.2 ± 0.2	51.6 ± 0.8	**75.2 ± 0.3**	76.7 ± 0.3	65.7
CORAL**	64.3 ± 0.4	54.3 ± 0.2	76.5 ± 0.3	78.0 ± 0.4	68.3
+T3A	64.2 ± 0.3	**56.1 ± 0.2**	**78.1 ± 0.1**	**78.6 ± 0.3**	**69.2**
+Tent-BN	**65.6 ± 0.5**	**56.5 ± 0.3**	76.3 ± 0.1	**78.4 ± 0.3**	**69.2**
+Tent-C	64.2 ± 0.2	54.0 ± 0.2	76.4 ± 0.3	**78.1 ± 0.4**	68.2

Table 6: Full results for Table 1 on OfficeHome.

Algorithm	L100	L38	L43	L46	Avg
ERM	49.8 ± 4.4	42.1 ± 1.4	56.9 ± 1.8	35.7 ± 3.9	46.1
IRM	54.6 ± 1.3	39.8 ± 1.9	56.2 ± 1.8	39.6 ± 0.8	47.6
GroupDRO	41.2 ± 0.7	38.6 ± 2.1	56.7 ± 0.9	36.4 ± 2.1	43.2
Mixup	59.6 ± 2.0	42.2 ± 1.4	55.9 ± 0.8	33.9 ± 1.4	47.9
MLDG	54.2 ± 3.0	44.3 ± 1.1	55.6 ± 0.3	36.9 ± 2.2	47.7
CORAL	51.6 ± 2.4	42.2 ± 1.0	57.0 ± 1.0	39.8 ± 2.9	47.6
MMD	41.9 ± 3.0	34.8 ± 1.0	57.0 ± 1.9	35.2 ± 1.8	42.2
DANN	51.1 ± 3.5	40.6 ± 0.6	57.4 ± 0.5	37.7 ± 1.8	46.7
CDANN	47.0 ± 1.9	41.3 ± 4.8	54.9 ± 1.7	39.8 ± 2.3	45.8
MTL	49.3 ± 1.2	39.6 ± 6.3	55.6 ± 1.1	37.8 ± 0.8	45.6
SagNet	53.0 ± 2.9	43.0 ± 2.5	57.9 ± 0.6	40.4 ± 1.3	48.6
ARM	49.3 ± 0.7	38.3 ± 2.4	55.8 ± 0.8	38.7 ± 1.3	45.5
VREx	48.2 ± 4.3	41.7 ± 1.3	56.8 ± 0.8	38.7 ± 3.1	46.4
RSC	50.2 ± 2.2	39.2 ± 1.4	56.3 ± 1.4	40.8 ± 0.6	46.6
ERM**	50.4 ± 2.4	45.1 ± 0.7	52.3 ± 1.3	38.1 ± 0.5	46.5
+T3A	48.6 ± 2.1	**45.7 ± 1.1**	52.1 ± 1.5	**41.5 ± 1.5**	**47.0**
+Tent-BN	**53.1 ± 1.3**	42.6 ± 0.9	46.6 ± 0.5	36.5 ± 0.5	44.7
+Tent-C	**51.2 ± 1.7**	44.9 ± 0.5	50.4 ± 0.7	35.5 ± 0.9	45.5
CORAL**	54.0 ± 3.4	43.3 ± 1.3	55.5 ± 1.4	39.4 ± 0.3	48.1
+T3A	49.1 ± 1.2	**44.3 ± 1.1**	54.6 ± 0.7	**41.1 ± 0.7**	47.3
+Tent-BN	51.0 ± 0.8	**44.2 ± 0.9**	52.2 ± 1.1	38.7 ± 0.6	46.5
+Tent-C	**55.0 ± 3.7**	42.1 ± 0.6	55.5 ± 1.6	38.7 ± 0.3	47.8

Table 7: Full results for Table 1 on TerraIncognita.

B.2 Full Results for Table 2

Table 8: Full results for Table 2 of resnet18.

(a) VLCS

	C	L	S	V	Avg
ERM	95.8 ± 0.4	60.4 ± 1.1	66.4 ± 0.8	70.2 ± 1.5	73.2
+T3C	**99.2 ± 0.3**	**64.5 ± 1.2**	**69.4 ± 1.0**	**73.0 ± 1.9**	76.5
+Tent-BN	82.6 ± 0.6	50.8 ± 1.2	54.5 ± 1.7	57.3 ± 1.5	61.3
+Tent-C	**96.1 ± 0.7**	57.4 ± 2.1	65.1 ± 1.1	67.4 ± 2.1	71.5

(b) PACS

	A	C	P	S	Avg
ERM	78.7 ± 1.3	74.3 ± 0.6	92.4 ± 0.2	75.6 ± 0.8	80.3
+T3C	**80.4 ± 0.7**	**75.2 ± 0.4**	**94.7 ± 0.5**	**76.5 ± 0.2**	81.7
+Tent-BN	**78.8 ± 0.8**	**76.3 ± 0.4**	**92.8 ± 0.3**	73.9 ± 0.2	80.5
+Tent-C	78.1 ± 1.8	74.3 ± 0.6	**92.5 ± 0.3**	75.0 ± 1.0	80.0

(c) OfficeHome

	A	C	P	R	Avg
ERM	46.1 ± 0.4	45.8 ± 0.3	65.0 ± 0.3	66.0 ± 0.3	55.7
+T3C	**47.0 ± 0.2**	**46.8 ± 1.0**	**68.0 ± 0.2**	**66.1 ± 0.4**	57.0
+Tent-BN	**46.5 ± 0.1**	44.6 ± 0.4	62.1 ± 0.4	62.5 ± 0.2	53.9
+Tent-C	46.0 ± 0.4	45.5 ± 0.4	64.9 ± 0.3	**66.1 ± 0.4**	55.6

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	41.6 ± 3.1	36.0 ± 3.0	51.0 ± 0.2	33.9 ± 1.0	40.7
+T3C	**48.6 ± 2.5**	**41.0 ± 1.9**	44.7 ± 0.7	31.8 ± 0.9	41.6
+Tent-BN	**49.6 ± 0.2**	**36.6 ± 2.0**	39.8 ± 1.4	33.1 ± 1.7	39.8
+Tent-C	**43.9 ± 3.3**	34.5 ± 3.3	48.8 ± 1.2	32.7 ± 1.7	40.0

Table 9: Full results for Table 2 of resnet50.

(a) VLCS

	C	L	S	V	Avg
ERM	97.6 ± 0.1	63.4 ± 0.5	69.3 ± 1.6	72.0 ± 1.5	75.5
+T3C	**99.1 ± 0.1**	**67.2 ± 0.8**	**73.7 ± 1.7**	**73.2 ± 1.5**	78.3
+Tent-BN	87.6 ± 0.9	61.7 ± 1.2	65.8 ± 1.4	64.6 ± 1.7	69.9
+Tent-C	94.1 ± 3.2	**64.8 ± 0.5**	67.0 ± 2.7	64.1 ± 2.2	72.5

(b) PACS

	A	C	P	S	Avg
ERM	84.8 ± 0.5	78.5 ± 0.6	96.1 ± 0.2	76.2 ± 1.1	83.9
+T3C	**86.0 ± 0.6**	**80.3 ± 0.9**	**96.4 ± 0.2**	75.2 ± 1.5	84.5
+Tent-BN	**84.9 ± 0.4**	**79.8 ± 0.6**	96.0 ± 0.4	75.7 ± 0.7	84.1
+Tent-C	73.5 ± 6.3	73.7 ± 4.0	96.0 ± 0.4	75.1 ± 1.6	79.6

(c) OfficeHome

	A	C	P	R	Avg
ERM	58.5 ± 0.4	50.7 ± 1.0	73.3 ± 0.5	75.0 ± 0.2	64.4
+T3C	**60.2 ± 0.3**	**53.4 ± 0.9**	**76.1 ± 0.4**	**76.2 ± 0.1**	66.5
+Tent-BN	**59.5 ± 0.2**	**52.5 ± 1.2**	72.3 ± 0.1	73.9 ± 0.2	64.6
+Tent-C	57.8 ± 0.6	49.1 ± 2.1	73.1 ± 0.6	74.9 ± 0.3	63.7

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	53.4 ± 4.1	39.0 ± 1.8	52.0 ± 1.0	37.1 ± 2.8	45.4
+T3C	52.7 ± 2.7	**40.6 ± 2.2**	51.9 ± 1.2	**38.5 ± 2.8**	45.9
+Tent-BN	**54.1 ± 2.7**	38.9 ± 1.9	44.6 ± 0.9	36.1 ± 1.6	43.4
+Tent-C	38.1 ± 14.2	37.7 ± 2.4	51.8 ± 1.3	35.3 ± 2.9	40.7

Table 10: Full results for Table 2 of BiT-M-R50x3.

(a) VLCS

	C	L	S	V	Avg
ERM	93.2 ± 0.4	66.1 ± 0.3	74.0 ± 0.4	73.3 ± 1.2	76.7
+T3C	**97.5 ± 0.4**	**67.5 ± 0.9**	**77.2 ± 0.5**	**76.5 ± 1.8**	79.7
+Tent-BN	89.5 ± 0.8	66.1 ± 0.8	69.2 ± 0.8	69.7 ± 1.2	73.6
+Tent-C	**93.4 ± 0.7**	60.9 ± 4.5	60.0 ± 6.7	72.2 ± 1.6	71.6

(b) PACS

	A	C	P	S	Avg
ERM	82.0 ± 1.7	82.3 ± 0.9	95.1 ± 0.4	78.1 ± 2.1	84.4
+T3C	**83.1 ± 2.0**	**83.8 ± 0.2**	**96.4 ± 0.2**	**78.5 ± 1.4**	85.4
+Tent-BN	**83.0 ± 1.4**	**83.0 ± 0.4**	**96.3 ± 0.4**	**79.0 ± 1.2**	85.3
+Tent-C	**83.3 ± 1.8**	81.4 ± 1.2	**95.2 ± 0.4**	77.8 ± 2.1	84.4

(c) OfficeHome

	A	C	P	R	Avg
ERM	64.3 ± 1.2	56.0 ± 0.9	78.1 ± 0.8	78.3 ± 0.7	69.2
+T3C	**65.8 ± 1.2**	**59.5 ± 1.4**	**80.9 ± 1.0**	**80.5 ± 0.8**	71.7
+Tent-BN	**66.6 ± 0.6**	**58.1 ± 1.4**	**79.3 ± 1.1**	**79.0 ± 0.8**	70.8
+Tent-C	63.8 ± 1.4	55.3 ± 1.0	78.1 ± 0.8	**78.5 ± 0.8**	68.9

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	60.6 ± 1.4	43.5 ± 2.9	59.0 ± 0.8	46.6 ± 2.9	52.5
+T3C	**60.8 ± 0.5**	**44.0 ± 1.9**	58.2 ± 0.9	45.9 ± 4.1	52.2
+Tent-BN	57.3 ± 0.5	**43.9 ± 1.6**	54.1 ± 0.7	46.6 ± 2.6	50.5
+Tent-C	55.7 ± 4.1	40.6 ± 3.7	**59.2 ± 1.0**	46.5 ± 2.7	50.5

Table 11: Full results for Table 2 of BiT-M-R101x3.

(a) VLCS

	C	L	S	V	Avg
ERM	93.4 ± 1.4	62.7 ± 1.4	71.3 ± 0.7	72.6 ± 1.3	75.0
+T3C	**97.6 ± 0.7**	**65.9 ± 1.5**	**75.6 ± 0.8**	**75.4 ± 1.4**	78.6
+Tent-BN	89.0 ± 2.2	**63.1 ± 0.4**	69.3 ± 0.6	68.1 ± 0.9	72.4
+Tent-C	**95.5 ± 1.4**	62.5 ± 1.5	65.3 ± 1.9	71.7 ± 0.5	73.8

(b) PACS

	A	C	P	S	Avg
ERM	81.1 ± 0.1	83.0 ± 0.8	94.0 ± 0.5	77.7 ± 1.5	84.0
+T3C	**81.6 ± 0.1**	**83.9 ± 0.8**	**95.2 ± 0.5**	**80.7 ± 0.9**	85.4
+Tent-BN	**82.7 ± 0.7**	**84.1 ± 0.4**	**94.9 ± 0.4**	**81.2 ± 0.8**	85.7
+Tent-C	**81.5 ± 0.4**	79.3 ± 1.9	88.9 ± 4.1	74.4 ± 3.6	81.0

(c) OfficeHome

	A	C	P	R	Avg
ERM	59.7 ± 1.2	55.4 ± 1.1	78.7 ± 0.2	76.9 ± 0.2	67.7
+T3C	**61.3 ± 1.2**	**58.2 ± 1.0**	**81.2 ± 0.3**	**78.9 ± 0.2**	69.9
+Tent-BN	**62.1 ± 1.2**	**57.4 ± 1.1**	**79.9 ± 0.4**	**77.6 ± 0.0**	69.2
+Tent-C	59.6 ± 1.3	54.7 ± 1.1	78.7 ± 0.2	**77.0 ± 0.3**	67.5

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	54.5 ± 4.2	39.9 ± 2.6	56.5 ± 0.7	40.5 ± 0.5	47.8
+T3C	**55.2 ± 3.8**	**41.3 ± 2.4**	55.8 ± 1.0	40.1 ± 1.5	48.1
+Tent-BN	54.1 ± 2.3	**41.2 ± 1.6**	54.6 ± 0.4	**41.4 ± 0.3**	47.8
+Tent-C	49.6 ± 3.9	38.2 ± 3.2	55.9 ± 0.7	40.1 ± 0.6	46.0

Table 12: Full results for Table 2 of BiT-M-R152x2.

(a) VLCS

	C	L	S	V	Avg
ERM	95.6 ± 1.0	66.0 ± 1.0	73.3 ± 1.4	71.8 ± 0.7	76.7
+T3C	**98.9 ± 0.2**	**68.2 ± 0.8**	**76.4 ± 2.2**	**72.8 ± 0.6**	79.1
+Tent-BN	92.6 ± 1.2	64.6 ± 0.1	70.3 ± 1.8	68.0 ± 0.9	73.9
+Tent-C	93.3 ± 0.2	64.0 ± 0.5	**74.1 ± 1.4**	70.3 ± 2.3	75.4

(b) PACS

	A	C	P	S	Avg
ERM	80.3 ± 1.4	82.2 ± 1.1	95.8 ± 0.6	82.6 ± 0.2	85.2
+T3C	**81.9 ± 1.3**	**83.7 ± 1.1**	**96.3 ± 0.5**	**83.6 ± 0.4**	86.4
+Tent-BN	**81.6 ± 1.4**	**82.9 ± 0.8**	95.6 ± 0.5	**82.8 ± 0.4**	85.7
+Tent-C	77.9 ± 1.6	68.2 ± 9.7	95.1 ± 0.7	**83.2 ± 0.6**	81.1

(c) OfficeHome

	A	C	P	R	Avg
ERM	63.2 ± 0.7	60.2 ± 1.0	79.7 ± 0.6	82.2 ± 0.3	71.3
+T3C	**64.4 ± 0.4**	**62.8 ± 1.4**	**82.0 ± 0.7**	**83.5 ± 0.2**	73.2
+Tent-BN	**64.7 ± 0.4**	**62.1 ± 0.9**	**80.4 ± 0.5**	**82.3 ± 0.2**	72.3
+Tent-C	63.1 ± 0.6	59.4 ± 1.2	79.7 ± 0.7	82.1 ± 0.4	71.1

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	57.3 ± 1.4	49.3 ± 1.5	58.8 ± 0.5	40.1 ± 2.5	51.4
+T3C	57.3 ± 0.3	48.3 ± 1.7	57.7 ± 1.2	**40.2 ± 2.0**	50.9
+Tent-BN	55.1 ± 0.7	47.1 ± 1.9	55.4 ± 0.4	**41.2 ± 1.8**	49.7
+Tent-C	31.6 ± 9.3	48.5 ± 1.3	58.2 ± 0.1	**40.7 ± 3.3**	44.8

Table 13: Full results for Table 2 of ViT-B16.

(a) VLCS

	C	L	S	V	Avg
ERM	97.1 ± 0.5	65.4 ± 1.2	76.6 ± 0.7	77.8 ± 0.5	79.2
+T3C	**97.7 ± 0.4**	**66.8 ± 0.8**	**78.3 ± 0.8**	**78.0 ± 0.7**	80.2
+Tent-BN	93.1 ± 0.9	**67.3 ± 0.6**	72.6 ± 0.8	75.9 ± 0.4	77.2
+Tent-C	**98.1 ± 0.4**	**65.9 ± 0.9**	76.3 ± 0.8	**79.1 ± 0.4**	79.9

(b) PACS

	A	C	P	S	Avg
ERM	89.9 ± 0.7	86.3 ± 0.4	99.2 ± 0.1	67.2 ± 0.1	85.7
+T3C	**90.1 ± 0.7**	**86.7 ± 0.5**	**99.3 ± 0.1**	**67.9 ± 0.3**	86.0
+Tent-BN	89.8 ± 0.6	**86.4 ± 0.5**	**99.3 ± 0.1**	**69.2 ± 0.9**	86.2
+Tent-C	**90.8 ± 0.8**	**86.5 ± 0.4**	**99.3 ± 0.1**	67.1 ± 0.1	85.9

(c) OfficeHome

	A	C	P	R	Avg
ERM	76.5 ± 0.6	62.7 ± 0.2	86.9 ± 0.1	87.6 ± 0.3	78.4
+T3C	**77.3 ± 0.8**	**63.1 ± 0.1**	**87.3 ± 0.1**	**87.9 ± 0.3**	78.9
+Tent-BN	**77.1 ± 0.7**	**63.3 ± 0.1**	**87.0 ± 0.2**	**87.7 ± 0.2**	78.8
+Tent-C	76.3 ± 0.6	62.1 ± 0.5	**87.0 ± 0.1**	**87.7 ± 0.3**	78.3

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	53.1 ± 1.9	26.0 ± 1.0	50.3 ± 0.6	37.9 ± 0.6	41.8
+T3C	52.6 ± 1.9	**28.4 ± 0.7**	49.7 ± 0.9	**39.2 ± 0.8**	42.5
+Tent-BN	48.0 ± 1.4	**30.6 ± 0.1**	47.6 ± 0.7	37.0 ± 0.7	40.8
+Tent-C	52.6 ± 2.1	**26.1 ± 1.2**	50.0 ± 1.2	37.4 ± 0.6	41.5

Table 14: Full results for Table 2 of ViT-L16.

(a) VLCS

	C	L	S	V	Avg
ERM	97.7 ± 0.2	62.8 ± 1.9	74.1 ± 0.2	78.1 ± 1.1	78.2
+T3C	**98.4 ± 0.1**	**63.5 ± 2.1**	**75.3 ± 0.2**	**78.8 ± 1.1**	79.0
+Tent-BN	94.5 ± 0.3	**65.4 ± 1.3**	69.4 ± 0.2	76.0 ± 0.8	76.3
+Tent-C	**98.9 ± 0.1**	**63.3 ± 2.1**	73.9 ± 0.3	**78.2 ± 1.5**	78.6

(b) PACS

	A	C	P	S	Avg
ERM	88.8 ± 0.6	83.3 ± 0.5	98.6 ± 0.1	67.5 ± 2.8	84.6
+T3C	**89.1 ± 0.6**	**84.6 ± 0.5**	98.4 ± 0.2	**69.7 ± 2.9**	85.5
+Tent-BN	**89.4 ± 0.6**	**85.3 ± 0.3**	98.5 ± 0.1	**70.3 ± 2.0**	85.9
+Tent-C	88.8 ± 0.8	82.4 ± 0.4	98.3 ± 0.1	67.0 ± 3.1	84.1

(c) OfficeHome

	A	C	P	R	Avg
ERM	77.2 ± 1.2	61.6 ± 0.9	85.3 ± 1.0	87.9 ± 0.4	78.0
+T3C	**77.7 ± 1.1**	**62.7 ± 1.0**	**86.2 ± 0.8**	**88.1 ± 0.5**	78.7
+Tent-BN	**77.5 ± 0.9**	**62.6 ± 0.8**	**85.7 ± 0.9**	**88.0 ± 0.4**	78.5
+Tent-C	75.6 ± 0.3	61.3 ± 0.9	85.2 ± 0.9	87.9 ± 0.4	77.5

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	56.0 ± 1.3	38.9 ± 2.7	40.7 ± 8.0	35.2 ± 1.6	42.7
+T3C	**56.5 ± 1.1**	**40.6 ± 2.8**	**48.3 ± 0.8**	**35.9 ± 2.5**	45.3
+Tent-BN	49.8 ± 0.8	**39.3 ± 2.4**	**46.4 ± 0.8**	35.1 ± 2.1	42.6
+Tent-C	**61.6 ± 0.4**	38.5 ± 2.7	**49.3 ± 0.5**	**35.5 ± 1.7**	46.2

Table 15: Full results for Table 2 of DeiT.

(a) VLCS

	C	L	S	V	Avg
ERM	97.3 ± 0.4	64.0 ± 0.6	76.9 ± 0.6	78.9 ± 0.8	79.3
+T3C	**98.6 ± 0.2**	**66.1 ± 0.6**	**79.8 ± 0.5**	**80.8 ± 0.4**	81.3
+Tent-BN	91.5 ± 0.5	**66.4 ± 0.8**	73.0 ± 0.5	76.5 ± 0.6	76.9
+Tent-C	**99.4 ± 0.1**	63.7 ± 1.4	**78.1 ± 1.6**	**79.3 ± 1.0**	80.1

(b) PACS

	A	C	P	S	Avg
ERM	92.8 ± 0.5	83.8 ± 0.5	98.5 ± 0.1	76.2 ± 1.4	87.8
+T3C	**93.4 ± 0.3**	**85.9 ± 0.4**	**98.8 ± 0.1**	**80.0 ± 1.1**	89.5
+Tent-BN	92.5 ± 0.5	**84.9 ± 0.4**	**99.0 ± 0.1**	**81.5 ± 0.9**	89.5
+Tent-C	**94.3 ± 0.4**	83.7 ± 0.7	**98.7 ± 0.1**	**77.1 ± 2.1**	88.4

(c) OfficeHome

	A	C	P	R	Avg
ERM	74.5 ± 0.2	63.3 ± 0.6	83.2 ± 0.2	85.5 ± 0.2	76.6
+T3C	**76.1 ± 0.2**	**65.6 ± 0.6**	**85.0 ± 0.2**	**86.5 ± 0.1**	78.3
+Tent-BN	**74.8 ± 0.4**	**64.3 ± 0.5**	**83.7 ± 0.1**	**85.7 ± 0.3**	77.1
+Tent-C	73.5 ± 0.4	**63.4 ± 0.7**	83.2 ± 0.2	**85.6 ± 0.3**	76.4

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	57.5 ± 2.9	44.0 ± 2.0	56.0 ± 0.4	42.3 ± 0.8	50.0
+T3C	**59.8 ± 1.9**	43.8 ± 1.4	54.8 ± 0.4	42.1 ± 1.4	50.1
+Tent-BN	52.0 ± 2.1	41.7 ± 1.2	52.3 ± 0.8	41.4 ± 1.1	46.9
+Tent-C	**59.1 ± 1.6**	43.5 ± 2.0	55.8 ± 0.4	41.7 ± 0.8	50.0

Table 16: Full results for Table 2 of HViT.

(a) VLCS

	C	L	S	V	Avg
ERM	96.8 ± 0.5	64.1 ± 0.9	75.9 ± 1.1	80.0 ± 1.2	79.2
+T3C	**97.6 ± 0.5**	**66.8 ± 1.1**	**78.4 ± 1.6**	**81.4 ± 1.2**	81.0
+Tent-BN	92.2 ± 0.1	**66.1 ± 0.8**	73.0 ± 1.2	77.8 ± 0.7	77.3
+Tent-C	**98.4 ± 0.7**	60.7 ± 4.8	75.3 ± 0.9	**80.8 ± 1.6**	78.8

(b) PACS

	A	C	P	S	Avg
ERM	89.5 ± 1.4	85.9 ± 2.6	98.0 ± 0.5	85.5 ± 1.1	89.7
+T3C	**90.1 ± 1.3**	**87.3 ± 1.9**	**98.4 ± 0.3**	**85.9 ± 1.3**	90.4
+Tent-BN	**89.8 ± 1.2**	**87.5 ± 1.4**	**98.4 ± 0.4**	**86.2 ± 0.8**	90.5
+Tent-C	**90.0 ± 0.7**	83.2 ± 4.0	**98.4 ± 0.3**	**85.8 ± 1.3**	89.3

(c) OfficeHome

	A	C	P	R	Avg
ERM	77.3 ± 1.2	68.4 ± 0.6	87.0 ± 0.2	87.5 ± 0.3	80.0
+T3C	**78.0 ± 1.1**	**69.0 ± 0.5**	**87.2 ± 0.2**	**87.9 ± 0.3**	80.5
+Tent-BN	**77.9 ± 1.1**	**68.7 ± 0.4**	**87.1 ± 0.1**	**87.7 ± 0.2**	80.3
+Tent-C	77.3 ± 1.2	68.1 ± 0.5	86.8 ± 0.2	87.5 ± 0.2	79.9

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	62.3 ± 2.2	44.6 ± 0.5	56.6 ± 0.6	41.9 ± 1.0	51.4
+T3C	**62.6 ± 2.5**	**46.4 ± 0.4**	**57.2 ± 0.7**	**43.1 ± 0.8**	52.3
+Tent-BN	58.5 ± 1.8	**45.3 ± 0.5**	55.1 ± 0.9	**42.7 ± 0.4**	50.4
+Tent-C	62.0 ± 2.1	44.2 ± 0.4	55.2 ± 1.1	**42.0 ± 1.0**	50.8

Table 17: Full results for Table 2 of Mixer-L16.

(a) VLCS

	C	L	S	V	Avg
ERM	98.8 ± 0.2	61.0 ± 0.4	72.5 ± 0.9	73.5 ± 0.3	76.4
+T3C	**99.7 ± 0.1**	**65.8 ± 0.4**	**77.3 ± 1.4**	**78.3 ± 1.2**	80.3
+Tent-BN	92.6 ± 0.5	59.9 ± 1.9	67.7 ± 1.3	71.1 ± 1.0	72.8
+Tent-C	**99.2 ± 0.3**	57.2 ± 3.0	71.3 ± 0.4	**73.7 ± 1.7**	75.3

(b) PACS

	A	C	P	S	Avg
ERM	79.9 ± 3.2	80.3 ± 0.8	97.6 ± 0.4	67.5 ± 0.3	81.3
+T3C	**81.8 ± 3.1**	**82.3 ± 0.5**	**98.7 ± 0.3**	**69.3 ± 0.7**	83.0
+Tent-BN	**81.7 ± 3.2**	**81.6 ± 0.6**	97.5 ± 0.4	67.5 ± 0.7	82.1
+Tent-C	**80.5 ± 2.9**	77.4 ± 1.4	**97.7 ± 0.4**	65.7 ± 1.3	80.3

(c) OfficeHome

	A	C	P	R	Avg
ERM	69.9 ± 2.4	51.3 ± 6.4	81.7 ± 1.6	74.9 ± 4.5	69.4
+T3C	**72.4 ± 2.0**	**54.9 ± 7.0**	**84.3 ± 1.6**	**77.4 ± 4.4**	72.3
+Tent-BN	**71.4 ± 2.1**	**53.1 ± 6.7**	**82.2 ± 1.5**	**75.4 ± 4.4**	70.5
+Tent-C	**70.1 ± 2.3**	51.3 ± 6.4	**81.9 ± 1.6**	74.2 ± 4.7	69.4

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	43.5 ± 1.6	24.9 ± 2.0	45.2 ± 0.2	34.6 ± 1.0	37.1
+T3C	**44.6 ± 1.5**	**30.1 ± 1.1**	42.6 ± 0.6	32.8 ± 1.1	37.5
+Tent-BN	39.7 ± 1.4	**31.6 ± 1.1**	40.4 ± 0.2	33.2 ± 0.4	36.2
+Tent-C	**45.4 ± 2.4**	24.0 ± 2.2	**45.4 ± 0.1**	34.3 ± 0.9	37.3

B.3 Full Results for Figure 1-a

B.3.1 Fine-tuning performance

Table 18: Full results for fine-tuning resnet18.

(a) VLCS

	C	L	S	V	Avg
ERM	95.8 ± 0.4	60.4 ± 1.1	66.4 ± 0.8	70.2 ± 1.5	73.2
+head	**99.3 ± 0.2**	**70.2 ± 0.9**	**76.6 ± 0.3**	**77.9 ± 0.9**	81.0
+body	**99.7 ± 0.0**	**72.5 ± 0.8**	**77.8 ± 0.4**	**81.3 ± 0.3**	82.8
+all	**99.7 ± 0.0**	**72.4 ± 0.8**	**77.8 ± 0.3**	**81.4 ± 0.2**	82.8

(b) PACS

	A	C	P	S	Avg
ERM	78.7 ± 1.3	74.3 ± 0.6	92.4 ± 0.2	75.6 ± 0.8	80.3
+head	**86.8 ± 0.3**	**84.7 ± 0.1**	**95.6 ± 0.1**	**86.0 ± 0.3**	88.3
+body	**90.2 ± 0.3**	**89.7 ± 0.3**	**96.2 ± 0.1**	**91.7 ± 0.1**	91.9
+all	**90.3 ± 0.4**	**89.7 ± 0.1**	**96.2 ± 0.2**	**91.6 ± 0.0**	91.9

(c) OfficeHome

	A	C	P	R	Avg
ERM	46.1 ± 0.4	45.8 ± 0.3	65.0 ± 0.3	66.0 ± 0.3	55.7
+head	46.1 ± 0.8	**55.9 ± 0.1**	**74.5 ± 0.1**	65.5 ± 0.7	60.5
+body	**55.1 ± 0.5**	**66.2 ± 0.3**	**78.4 ± 0.3**	**72.0 ± 0.2**	67.9
+all	**55.0 ± 0.4**	**66.3 ± 0.3**	**78.7 ± 0.4**	**71.8 ± 0.3**	68.0

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	41.6 ± 3.1	36.0 ± 3.0	51.0 ± 0.2	33.9 ± 1.0	40.7
+head	**80.6 ± 0.2**	**75.3 ± 0.3**	**67.9 ± 0.1**	**61.5 ± 1.5**	71.3
+body	**89.6 ± 0.4**	**86.7 ± 0.5**	**80.6 ± 0.3**	**78.5 ± 0.2**	83.9
+all	**89.7 ± 0.3**	**86.5 ± 0.1**	**80.9 ± 0.1**	**78.3 ± 0.6**	83.9

Table 19: Full results for fine-tuning resnet50.

(a) VLCS

	C	L	S	V	Avg
ERM	97.6 ± 0.1	63.4 ± 0.5	69.3 ± 1.6	72.0 ± 1.5	75.5
+head	**99.1 ± 0.1**	**71.9 ± 0.2**	**78.1 ± 0.3**	**82.5 ± 0.8**	82.9
+body	**99.9 ± 0.1**	**73.7 ± 0.7**	**80.4 ± 0.7**	**85.1 ± 0.5**	84.8
+all	**99.7 ± 0.1**	**73.6 ± 0.5**	**80.5 ± 0.6**	**85.1 ± 0.5**	84.7

(b) PACS

	A	C	P	S	Avg
ERM	84.8 ± 0.5	78.5 ± 0.6	96.1 ± 0.2	76.2 ± 1.1	83.9
+head	**89.8 ± 0.1**	**88.6 ± 0.8**	**96.4 ± 0.1**	**84.6 ± 0.3**	89.8
+body	**93.3 ± 0.3**	**93.0 ± 0.5**	**97.5 ± 0.1**	**93.2 ± 0.2**	94.2
+all	**93.5 ± 0.1**	**93.1 ± 0.5**	**97.4 ± 0.0**	**93.0 ± 0.1**	94.2

(c) OfficeHome

	A	C	P	R	Avg
ERM	58.5 ± 0.4	50.7 ± 1.0	73.3 ± 0.5	75.0 ± 0.2	64.4
+head	58.1 ± 0.5	**62.1 ± 0.6**	**79.6 ± 0.3**	73.8 ± 0.7	68.4
+body	**67.5 ± 0.8**	**71.7 ± 0.3**	**84.7 ± 0.3**	**79.6 ± 0.1**	75.9
+all	**67.1 ± 0.8**	**72.5 ± 0.3**	**84.5 ± 0.3**	**79.8 ± 0.3**	76.0

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	53.4 ± 4.1	39.0 ± 1.8	52.0 ± 1.0	37.1 ± 2.8	45.4
+head	**81.4 ± 0.7**	**75.4 ± 1.0**	**67.4 ± 2.1**	**61.4 ± 1.4**	71.4
+body	**91.0 ± 0.2**	**87.2 ± 0.2**	**80.8 ± 0.6**	**80.0 ± 0.6**	84.7
+all	**90.2 ± 0.3**	**85.5 ± 1.5**	**81.5 ± 0.3**	**79.9 ± 0.1**	84.3

Table 20: Full results for fine-tuning BiT-M-R50x3.

(a) VLCS

	C	L	S	V	Avg
ERM	93.2 ± 0.4	66.1 ± 0.3	74.0 ± 0.4	73.3 ± 1.2	76.7
+head	**98.8 ± 0.3**	**73.3 ± 1.2**	**81.0 ± 0.1**	**83.1 ± 0.9**	84.1
+body	**99.1 ± 0.2**	**74.3 ± 0.8**	**79.7 ± 0.8**	**83.9 ± 0.6**	84.2
+all	**99.3 ± 0.2**	**75.4 ± 0.3**	**80.5 ± 0.2**	**84.6 ± 0.4**	84.9

(b) PACS

	A	C	P	S	Avg
ERM	82.0 ± 1.7	82.3 ± 0.9	95.1 ± 0.4	78.1 ± 2.1	84.4
+head	**90.1 ± 0.7**	**90.5 ± 0.7**	**97.2 ± 0.2**	**88.5 ± 0.5**	91.6
+body	**92.0 ± 0.3**	**94.2 ± 0.7**	**96.7 ± 0.1**	**92.9 ± 0.5**	94.0
+all	**92.5 ± 1.0**	**93.8 ± 0.3**	**96.0 ± 0.5**	**93.0 ± 0.2**	93.8

(c) OfficeHome

	A	C	P	R	Avg
ERM	64.3 ± 1.2	56.0 ± 0.9	78.1 ± 0.8	78.3 ± 0.7	69.2
+head	**66.9 ± 0.4**	**68.8 ± 0.7**	68.3 ± 15.2	**80.9 ± 0.4**	71.2
+body	**68.9 ± 2.7**	**72.0 ± 0.6**	**86.6 ± 0.7**	**81.5 ± 0.6**	77.3
+all	**66.7 ± 1.5**	**73.8 ± 0.7**	**85.4 ± 0.7**	**82.1 ± 0.2**	77.0

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	60.6 ± 1.4	43.5 ± 2.9	59.0 ± 0.8	46.6 ± 2.9	52.5
+head	**86.1 ± 0.5**	**79.9 ± 1.3**	**74.6 ± 0.2**	**72.9 ± 0.7**	78.4
+body	**91.2 ± 0.4**	**88.6 ± 0.3**	**84.0 ± 0.2**	**81.4 ± 0.2**	86.3
+all	**91.7 ± 0.0**	**89.0 ± 0.4**	**83.9 ± 0.6**	**82.6 ± 0.8**	86.8

Table 21: Full results for fine-tuning BiT-M-R101x3.

(a) VLCS

	C	L	S	V	Avg
ERM	93.4 ± 1.4	62.7 ± 1.4	71.3 ± 0.7	72.6 ± 1.3	75.0
+head	**98.5 ± 0.6**	**73.8 ± 1.4**	**79.3 ± 0.9**	**80.2 ± 1.7**	82.9
+body	**98.9 ± 0.3**	**72.3 ± 0.3**	**80.6 ± 0.4**	**80.8 ± 0.3**	83.2
+all	**99.0 ± 0.1**	**73.6 ± 0.5**	**79.6 ± 1.0**	**79.7 ± 1.2**	82.9

(b) PACS

	A	C	P	S	Avg
ERM	81.1 ± 0.1	83.0 ± 0.8	94.0 ± 0.5	77.7 ± 1.5	84.0
+head	**88.9 ± 0.8**	**90.8 ± 0.2**	**95.8 ± 0.5**	**89.8 ± 0.7**	91.3
+body	**91.3 ± 0.6**	**93.6 ± 0.1**	**96.2 ± 0.2**	**93.0 ± 0.5**	93.5
+all	**89.2 ± 1.8**	**93.8 ± 0.2**	**95.0 ± 0.6**	**93.1 ± 0.4**	92.8

(c) OfficeHome

	A	C	P	R	Avg
ERM	59.7 ± 1.2	55.4 ± 1.1	78.7 ± 0.2	76.9 ± 0.2	67.7
+head	**63.0 ± 0.7**	**67.0 ± 1.3**	**85.4 ± 0.7**	**79.8 ± 0.4**	73.8
+body	**67.9 ± 0.4**	**70.0 ± 1.2**	**82.3 ± 0.6**	**78.7 ± 1.0**	74.7
+all	**67.2 ± 0.5**	**72.6 ± 1.1**	**85.2 ± 1.0**	**77.7 ± 2.0**	75.7

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	54.5 ± 4.2	39.9 ± 2.6	56.5 ± 0.7	40.5 ± 0.5	47.8
+head	**84.8 ± 0.8**	**77.4 ± 0.8**	**71.5 ± 0.3**	**69.9 ± 0.8**	75.9
+body	**90.9 ± 0.3**	**88.5 ± 0.2**	**82.8 ± 0.5**	**81.9 ± 0.2**	86.0
+all	**91.6 ± 0.1**	**88.6 ± 0.2**	**84.5 ± 0.2**	**82.0 ± 0.5**	86.7

Table 22: Full results for fine-tuning BiT-M-R152x2.

(a) VLCS

	C	L	S	V	Avg
ERM	95.6 ± 1.0	66.0 ± 1.0	73.3 ± 1.4	71.8 ± 0.7	76.7
+head	**99.0 ± 0.2**	**74.2 ± 0.5**	**80.2 ± 0.4**	**80.9 ± 1.0**	83.6
+body	**99.6 ± 0.0**	**74.9 ± 0.6**	**81.0 ± 0.3**	**83.8 ± 0.3**	84.8
+all	**99.5 ± 0.1**	**74.6 ± 0.3**	**81.3 ± 0.2**	**82.7 ± 1.1**	84.5

(b) PACS

	A	C	P	S	Avg
ERM	80.3 ± 1.4	82.2 ± 1.1	95.8 ± 0.6	82.6 ± 0.2	85.2
+head	**89.4 ± 1.3**	**89.7 ± 0.5**	**96.7 ± 0.2**	**90.7 ± 0.4**	91.6
+body	**92.5 ± 0.1**	**95.5 ± 0.2**	**97.2 ± 0.2**	**93.1 ± 0.5**	94.6
+all	**92.0 ± 0.0**	**95.2 ± 0.4**	**97.1 ± 0.2**	**93.1 ± 0.6**	94.4

(c) OfficeHome

	A	C	P	R	Avg
ERM	63.2 ± 0.7	60.2 ± 1.0	79.7 ± 0.6	82.2 ± 0.3	71.3
+head	**66.8 ± 2.0**	**71.6 ± 0.7**	**86.6 ± 0.5**	**83.7 ± 0.6**	77.2
+body	**72.6 ± 0.7**	**74.1 ± 1.7**	**87.9 ± 0.6**	**83.8 ± 0.2**	79.6
+all	**72.3 ± 0.6**	**75.4 ± 1.1**	**86.6 ± 1.2**	**82.8 ± 0.3**	79.3

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	57.3 ± 1.4	49.3 ± 1.5	58.8 ± 0.5	40.1 ± 2.5	51.4
+head	**85.7 ± 0.3**	**78.9 ± 0.7**	**74.2 ± 1.2**	**69.2 ± 1.0**	77.0
+body	**91.3 ± 0.1**	**89.1 ± 0.5**	**83.2 ± 0.1**	**82.4 ± 0.2**	86.5
+all	**91.2 ± 0.0**	**88.6 ± 0.3**	**82.8 ± 0.3**	**81.8 ± 0.2**	86.1

Table 23: Full results for fine-tuning ViT-B16.

(a) VLCS

	C	L	S	V	Avg
ERM	97.1 ± 0.5	65.4 ± 1.2	76.6 ± 0.7	77.8 ± 0.5	79.2
+head	**99.2 ± 0.2**	**76.1 ± 0.4**	**84.3 ± 0.3**	**86.7 ± 0.2**	86.6
+body	**99.9 ± 0.1**	**78.0 ± 0.5**	**84.1 ± 0.2**	**87.6 ± 0.4**	87.4
+all	**99.9 ± 0.1**	**79.0 ± 0.0**	**84.2 ± 0.2**	**87.4 ± 0.3**	87.6

(b) PACS

	A	C	P	S	Avg
ERM	89.9 ± 0.7	86.3 ± 0.4	99.2 ± 0.1	67.2 ± 0.1	85.7
+head	**93.3 ± 0.5**	**92.0 ± 0.4**	99.2 ± 0.1	**80.2 ± 0.5**	91.2
+body	**95.2 ± 0.2**	**95.3 ± 0.2**	**99.3 ± 0.2**	**88.8 ± 0.5**	94.7
+all	**95.2 ± 0.3**	**95.3 ± 0.2**	**99.3 ± 0.2**	**88.7 ± 0.3**	94.6

(c) OfficeHome

	A	C	P	R	Avg
ERM	76.5 ± 0.6	62.7 ± 0.2	86.9 ± 0.1	87.6 ± 0.3	78.4
+head	**78.9 ± 0.3**	**69.3 ± 0.5**	**89.6 ± 0.1**	**88.3 ± 0.6**	81.5
+body	**82.0 ± 0.2**	**77.4 ± 0.2**	**92.2 ± 0.2**	**89.9 ± 0.3**	85.4
+all	**82.4 ± 0.2**	**77.6 ± 0.2**	**92.1 ± 0.3**	**89.9 ± 0.3**	85.5

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	53.1 ± 1.9	26.0 ± 1.0	50.3 ± 0.6	37.9 ± 0.6	41.8
+head	**84.7 ± 0.1**	**79.2 ± 0.2**	**73.6 ± 0.2**	**70.3 ± 0.4**	76.9
+body	**89.6 ± 0.4**	**87.2 ± 0.4**	**81.4 ± 0.0**	**79.7 ± 0.7**	84.5
+all	**90.2 ± 0.1**	**87.2 ± 0.3**	**81.5 ± 0.2**	**79.9 ± 0.4**	84.7

Table 24: Full results for fine-tuning ViT-L16.

(a) VLCS

	C	L	S	V	Avg
ERM	97.7 ± 0.2	62.8 ± 1.9	74.1 ± 0.2	78.1 ± 1.1	78.2
+head	**99.3 ± 0.1**	**77.1 ± 0.4**	**82.4 ± 0.7**	**86.4 ± 0.2**	86.3
+body	**99.8 ± 0.1**	**76.7 ± 0.1**	**82.8 ± 0.3**	**87.4 ± 0.3**	86.7
+all	**99.7 ± 0.2**	**76.4 ± 0.2**	**82.7 ± 0.3**	**87.1 ± 0.3**	86.5

(b) PACS

	A	C	P	S	Avg
ERM	88.8 ± 0.6	83.3 ± 0.5	98.6 ± 0.1	67.5 ± 2.8	84.6
+head	**93.0 ± 0.3**	**93.2 ± 0.3**	**98.7 ± 0.2**	**83.2 ± 0.4**	92.0
+body	**94.8 ± 0.4**	**95.8 ± 0.1**	**98.9 ± 0.2**	**90.5 ± 0.6**	95.0
+all	**94.7 ± 0.4**	**96.3 ± 0.2**	**98.9 ± 0.2**	**90.3 ± 1.0**	95.1

(c) OfficeHome

	A	C	P	R	Avg
ERM	77.2 ± 1.2	61.6 ± 0.9	85.3 ± 1.0	87.9 ± 0.4	78.0
+head	**79.1 ± 1.0**	**70.8 ± 0.9**	**89.6 ± 0.8**	**88.9 ± 0.3**	82.1
+body	**80.7 ± 0.3**	**80.5 ± 0.4**	**91.8 ± 0.3**	**89.8 ± 0.2**	85.7
+all	**80.5 ± 0.1**	**80.2 ± 0.3**	**92.3 ± 0.2**	**89.9 ± 0.1**	85.7

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	56.0 ± 1.3	38.9 ± 2.7	40.7 ± 8.0	35.2 ± 1.6	42.7
+head	**86.2 ± 0.9**	**79.8 ± 0.7**	**75.8 ± 0.4**	**70.9 ± 0.7**	78.2
+body	**90.8 ± 0.2**	**87.3 ± 0.9**	**81.5 ± 0.7**	**79.5 ± 0.4**	84.8
+all	**90.6 ± 0.4**	**86.9 ± 0.2**	**81.7 ± 0.2**	**78.9 ± 0.7**	84.5

Table 25: Full results for fine-tuning DeiT.

(a) VLCS

	C	L	S	V	Avg
ERM	97.3 ± 0.4	64.0 ± 0.6	76.9 ± 0.6	78.9 ± 0.8	79.3
+head	**99.7 ± 0.2**	**72.1 ± 0.2**	**82.2 ± 0.7**	**86.8 ± 0.6**	85.2
+body	**99.9 ± 0.0**	**77.3 ± 0.3**	**85.0 ± 0.2**	**88.4 ± 0.4**	87.7
+all	**99.9 ± 0.0**	**77.3 ± 0.3**	**85.0 ± 0.2**	**88.4 ± 0.4**	87.7

(b) PACS

	A	C	P	S	Avg
ERM	92.8 ± 0.5	83.8 ± 0.5	98.5 ± 0.1	76.2 ± 1.4	87.8
+head	**95.9 ± 0.1**	**94.1 ± 0.4**	**99.2 ± 0.1**	**91.5 ± 0.5**	95.2
+body	**96.6 ± 0.4**	**96.0 ± 0.1**	**99.3 ± 0.1**	**94.6 ± 0.2**	96.6
+all	**96.6 ± 0.4**	**96.1 ± 0.1**	**99.3 ± 0.1**	**94.6 ± 0.2**	96.6

(c) OfficeHome

	A	C	P	R	Avg
ERM	74.5 ± 0.2	63.3 ± 0.6	83.2 ± 0.2	85.5 ± 0.2	76.6
+head	**78.6 ± 0.3**	**75.4 ± 0.1**	**89.5 ± 0.0**	**87.3 ± 0.2**	82.7
+body	**80.9 ± 0.0**	**79.7 ± 0.2**	**91.0 ± 0.2**	**88.4 ± 0.1**	85.0
+all	**80.9 ± 0.0**	**79.7 ± 0.2**	**91.0 ± 0.2**	**88.5 ± 0.1**	85.0

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	57.5 ± 2.9	44.0 ± 2.0	56.0 ± 0.4	42.3 ± 0.8	50.0
+head	**88.5 ± 0.3**	**84.5 ± 0.1**	**79.3 ± 0.5**	**75.6 ± 0.2**	82.0
+body	**90.8 ± 0.4**	**88.9 ± 0.3**	**83.6 ± 0.3**	**82.1 ± 0.1**	86.3
+all	**90.8 ± 0.4**	**88.7 ± 0.0**	**83.6 ± 0.1**	**81.7 ± 0.4**	86.2

Table 26: Full results for fine-tuning HViT.

(a) VLCS

	C	L	S	V	Avg
ERM	96.8 ± 0.5	64.1 ± 0.9	75.9 ± 1.1	80.0 ± 1.2	79.2
+head	**99.6 ± 0.1**	**76.9 ± 1.0**	**83.1 ± 0.2**	**87.3 ± 0.8**	86.7
+body	**99.8 ± 0.0**	**77.0 ± 0.2**	**84.1 ± 0.3**	**88.7 ± 0.3**	87.4
+all	**99.8 ± 0.0**	**77.2 ± 0.3**	**84.7 ± 0.4**	**88.5 ± 0.4**	87.6

(b) PACS

	A	C	P	S	Avg
ERM	89.5 ± 1.4	85.9 ± 2.6	98.0 ± 0.5	85.5 ± 1.1	89.7
+head	**93.1 ± 0.5**	**93.7 ± 0.6**	**98.6 ± 0.3**	**92.3 ± 0.0**	94.4
+body	**96.0 ± 0.2**	**97.3 ± 0.4**	**99.0 ± 0.1**	**95.4 ± 0.2**	96.9
+all	**96.0 ± 0.3**	**97.2 ± 0.4**	**98.9 ± 0.1**	**95.3 ± 0.0**	96.8

(c) OfficeHome

	A	C	P	R	Avg
ERM	77.3 ± 1.2	68.4 ± 0.6	87.0 ± 0.2	87.5 ± 0.3	80.0
+head	**80.4 ± 1.4**	**77.0 ± 0.4**	**90.3 ± 0.1**	**89.1 ± 0.1**	84.2
+body	**82.6 ± 0.9**	**83.3 ± 0.4**	**92.7 ± 0.3**	**89.9 ± 0.3**	87.1
+all	**82.7 ± 0.9**	**83.2 ± 0.5**	**93.0 ± 0.1**	**89.7 ± 0.4**	87.2

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	62.3 ± 2.2	44.6 ± 0.5	56.6 ± 0.6	41.9 ± 1.0	51.4
+head	**88.8 ± 0.5**	**83.9 ± 0.1**	**79.0 ± 0.7**	**75.3 ± 0.3**	81.8
+body	**91.4 ± 0.4**	**89.7 ± 0.2**	**83.0 ± 0.8**	**81.8 ± 0.6**	86.5
+all	**91.8 ± 0.1**	**89.2 ± 0.1**	**82.4 ± 0.5**	**82.4 ± 0.2**	86.4

Table 27: Full results for fine-tuning Mixer-L16.

(a) VLCS

	C	L	S	V	Avg
ERM	98.8 ± 0.2	61.0 ± 0.4	72.5 ± 0.9	73.5 ± 0.3	76.4
+head	**99.6 ± 0.1**	**72.8 ± 0.4**	**80.6 ± 0.5**	**83.7 ± 0.4**	84.2
+body	**99.7 ± 0.1**	**73.9 ± 0.2**	**81.2 ± 0.4**	**84.2 ± 0.3**	84.8
+all	**99.6 ± 0.2**	**74.2 ± 0.1**	**81.0 ± 0.4**	**83.7 ± 0.6**	84.6

(b) PACS

	A	C	P	S	Avg
ERM	79.9 ± 3.2	80.3 ± 0.8	97.6 ± 0.4	67.5 ± 0.3	81.3
+head	**89.6 ± 1.2**	**90.9 ± 0.5**	**98.5 ± 0.1**	**81.5 ± 0.8**	90.1
+body	**90.4 ± 0.7**	**93.6 ± 0.3**	96.6 ± 0.5	**86.3 ± 0.5**	91.7
+all	**90.8 ± 0.7**	**93.7 ± 0.4**	96.5 ± 0.5	**86.7 ± 1.7**	91.9

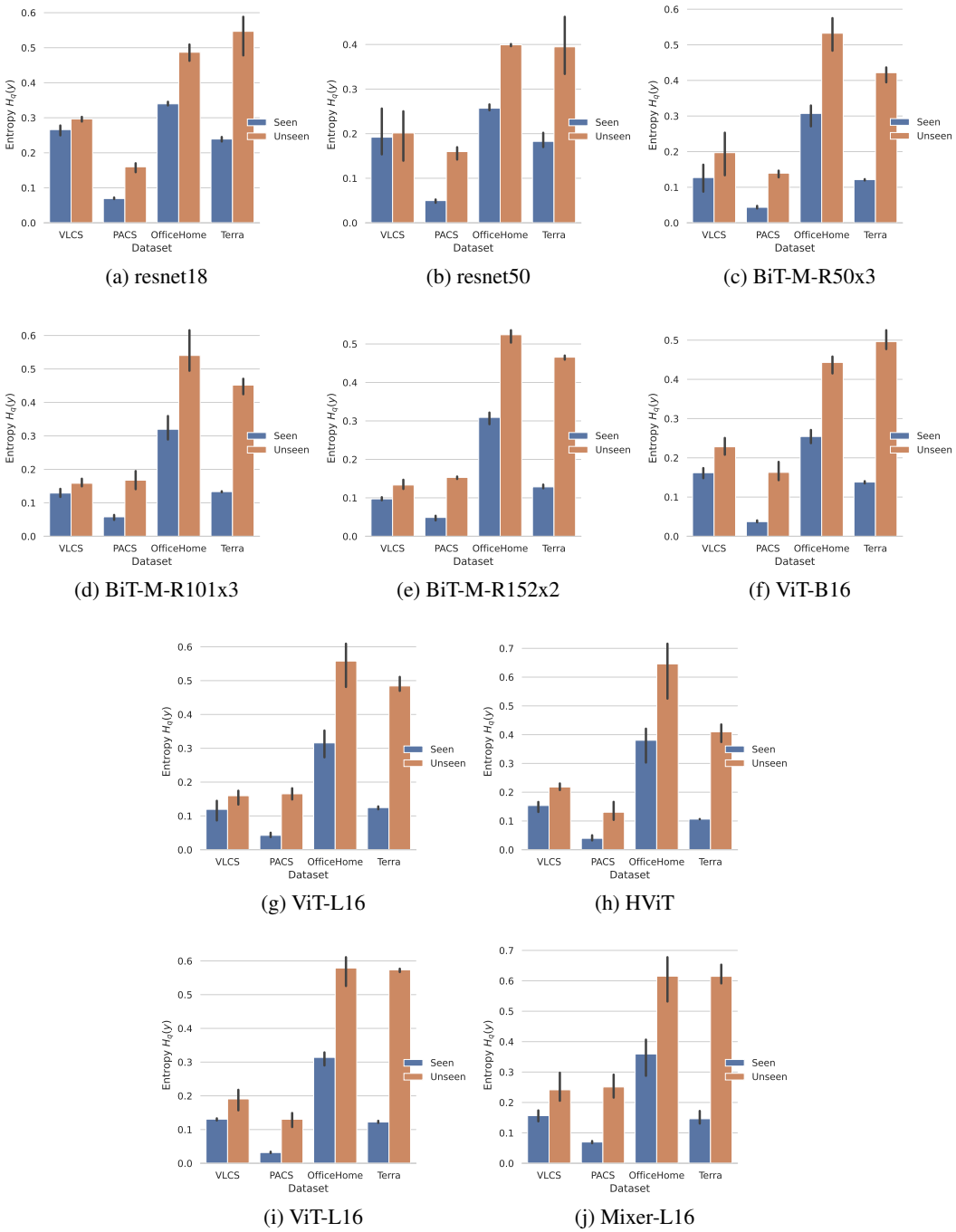
(c) OfficeHome

	A	C	P	R	Avg
ERM	69.9 ± 2.4	51.3 ± 6.4	81.7 ± 1.6	74.9 ± 4.5	69.4
+head	**74.3 ± 1.7**	**67.0 ± 4.7**	**88.4 ± 0.8**	**79.0 ± 3.7**	77.2
+body	**73.5 ± 0.6**	**71.3 ± 4.2**	**87.7 ± 0.5**	**81.1 ± 2.9**	78.4
+all	**73.2 ± 0.7**	**71.7 ± 4.2**	**88.2 ± 0.4**	**80.3 ± 2.6**	78.4

(d) TerraIncognita

	L100	L38	L43	L46	Avg
ERM	43.5 ± 1.6	24.9 ± 2.0	45.2 ± 0.2	34.6 ± 1.0	37.1
+head	**87.5 ± 0.3**	**79.9 ± 0.9**	**76.3 ± 0.6**	**67.6 ± 0.4**	77.8
+body	**90.1 ± 0.2**	**85.4 ± 0.2**	**80.3 ± 0.1**	**76.7 ± 0.3**	83.1
+all	**89.8 ± 0.1**	**85.6 ± 0.2**	**80.8 ± 0.3**	**76.6 ± 0.9**	83.2

B.3.2 Prediction entropy on seen and unseen domains



(a) resnet18 (b) resnet50 (c) BiT-M-R50x3

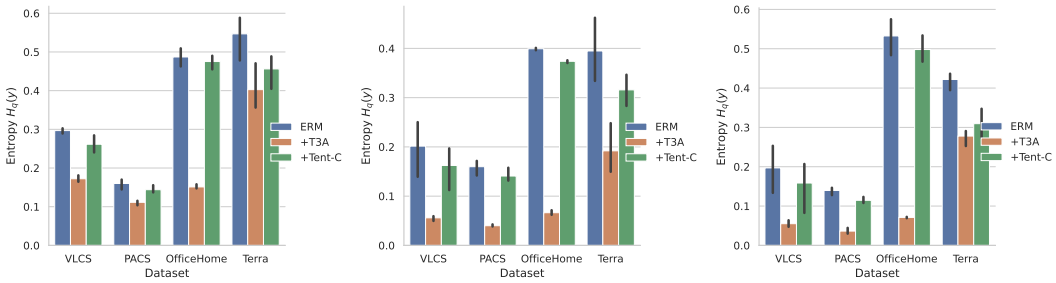
(d) BiT-M-R101x3 (e) BiT-M-R152x2 (f) ViT-B16

(g) ViT-L16 (h) HViT

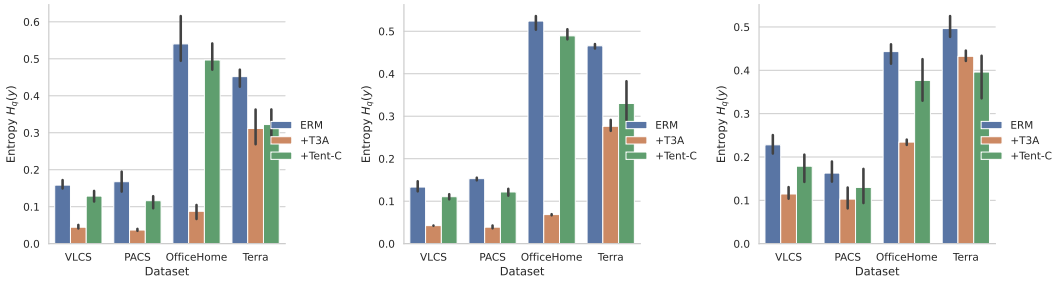
(i) ViT-L16 (j) Mixer-L16

Figure 3: Full results for Figure 1-b. Each figure corresponds to the results of different backbone networks.

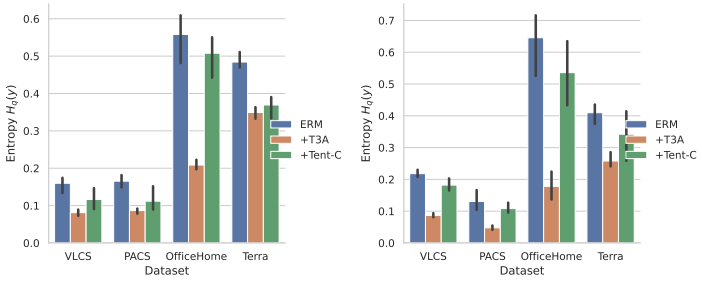
B.4 Tent vs. T3A in entropy



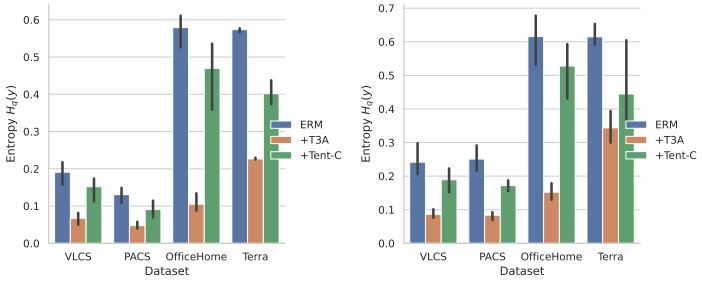
(a) resnet18 (b) resnet50 (c) BiT-M-R50x3



(d) BiT-M-R101x3 (e) BiT-M-R152x2 (f) ViT-B16



(g) ViT-L16 (h) HViT



(i) ViT-L16 (j) Mixer-L16

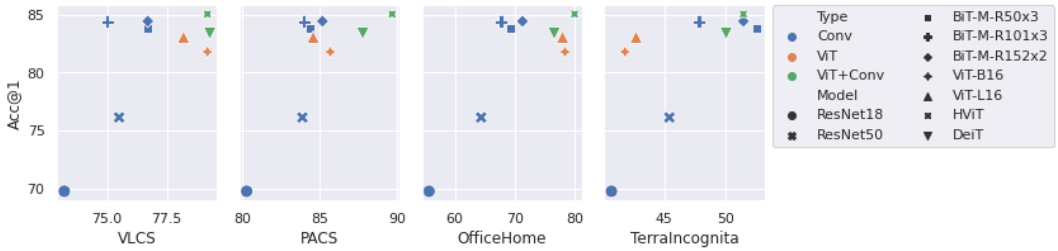
Figure 4: Full results for Figure 1-c. Each figure corresponds to the results of different backbone networks.

C Comparing T3A with Other Test-Time Adaptation Methods using Oracle Model Selection

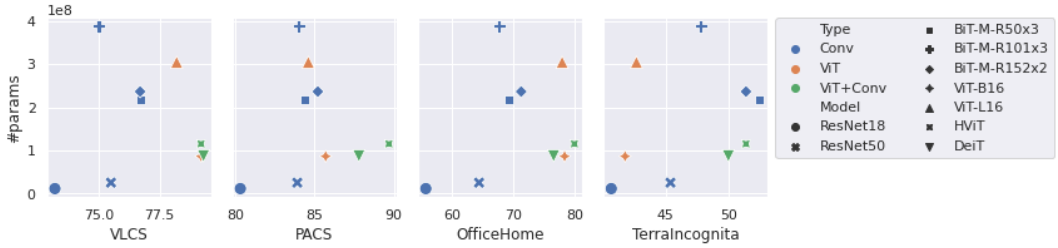
Table 28: Comparison of our method and existing test-time adaptation methods. Unlike Table 3, the results here select the hyper-parameter in the test-domain validation set (Oracle setup [17]). As with Table 3, this experiments is conducted only on the default hyperparameters of ERM. Bold type indicates performance improvement, and * indicates statistical significance in paired t-test (* indicates $p \leq 0.05$).

Models	**VLCS**	**PACS**	**OfficeHome**	**Terra**	**Avg**
resnet18-BN	73.0 ± 0.6	79.5 ± 0.4	61.8 ± 0.3	41.7 ± 0.9	64.0
SHOTIM	60.8 ± 0.3	**81.5 ± 0.2**	**62.4 ± 0.3**	29.5 ± 1.3	58.6
SHOT	61.2 ± 0.4	**81.4 ± 0.2**	**62.4 ± 0.3**	32.3 ± 0.6	59.3
PseudoLabel	65.4 ± 0.2	73.1 ± 2.5	54.7 ± 4.6	37.7 ± 2.5	57.7
PLClf	72.5 ± 1.3	78.4 ± 0.8	61.8 ± 0.3	**43.9 ± 1.3**	64.2
TentFull	**73.8 ± 0.8**	**84.7 ± 0.2**	**62.7 ± 0.1**	37.4 ± 0.8	64.7
TentNorm	70.3 ± 0.9	**82.7 ± 0.1**	**62.1 ± 0.1**	36.6 ± 0.2	62.9
TentClf	72.3 ± 1.1	77.3 ± 1.8	61.3 ± 0.3	37.8 ± 2.7	62.2
TentPreBN	64.7 ± 0.7	**81.2 ± 0.2**	**62.6 ± 0.3**	36.4 ± 1.0	61.2
T3A	**73.8 ± 0.8**	**81.3 ± 0.0**	**62.8 ± 0.3**	40.5 ± 0.3	64.6*
resnet50-BN	74.3 ± 0.5	84.1 ± 0.1	66.9 ± 0.2	45.8 ± 1.8	67.8
SHOTIM	55.2 ± 4.6	83.7 ± 0.2	**67.5 ± 0.2**	27.0 ± 1.4	58.3
SHOT	61.4 ± 1.5	**85.1 ± 0.4**	**67.5 ± 0.3**	30.9 ± 2.3	61.2
PseudoLabel	64.2 ± 2.3	70.4 ± 1.0	55.0 ± 1.8	33.0 ± 7.4	55.6
PLClf	73.5 ± 0.9	**84.6 ± 0.4**	66.7 ± 0.2	**46.7 ± 1.6**	67.9
TentFull	**74.8 ± 1.2**	**87.7 ± 0.1**	**67.0 ± 0.4**	42.9 ± 0.2	68.1
TentNorm	71.4 ± 0.5	**85.7 ± 0.1**	66.6 ± 0.0	42.4 ± 0.4	66.5
TentClf	72.6 ± 0.8	83.3 ± 0.5	66.7 ± 0.2	45.0 ± 0.9	66.9
TentPreBN	65.7 ± 1.4	**84.9 ± 0.0**	**67.7 ± 0.2**	42.7 ± 0.5	65.3
T3A	**76.1 ± 0.2**	**85.2 ± 0.2**	**67.8 ± 0.2**	**46.0 ± 1.5**	68.8**

D ImageNet Top-1 Accuracy vs. DG Performance



(a) ImageNet top-1 accuracy vs. domain generalization performance.



(b) #Parameters vs. domain generalization performance.

Figure 5: Comparing domain generalization performance on four datasets and properties of the pretrained models. (a) ImageNet top-1 accuracy of each backbone networks vs. domain generalization performance. (b) The number of parameters of each backbone networks vs. domain generalization performance.

Figure 5 illustrates the correlation between domain generalization performance on each dataset and properties of the backbone networks (ImageNet top-1 accuracy and the number of parameters). For visualization, we split backbone networks into (1) Conv (blue): pure convolution (ResNet18, ResNet50, and BiT), (2) ViT (orange): pure vision transformer (ViT-B16 and ViT-L16), and (3) ViT+Conv (green): hybrid of convolution and transformer (HViT and DeiT). Note that, DeiT does not use convolution in the architecture design, but it distills the knowledge from the convolution-based model during training. Each marker corresponds to different backbone networks.

We can make the following observations. (1) Looking only at Conv, there is a correlation between the performance of the ImageNet and the performance of DG, but there is no correlation across architectures. (2) ViT+Conv models work well on all datasets. ViT models also significantly outperform Conv models in VLCS and OfficeHome but perform significantly worse in TerraIncognita datasets. (3) There is no correlation between the number of parameters and domain generalization performance. While most literature in DG focuses on ResNet50, this result suggests the practical importance of choosing the network structure according to the datasets and methods that can improve the performance regardless of the model.