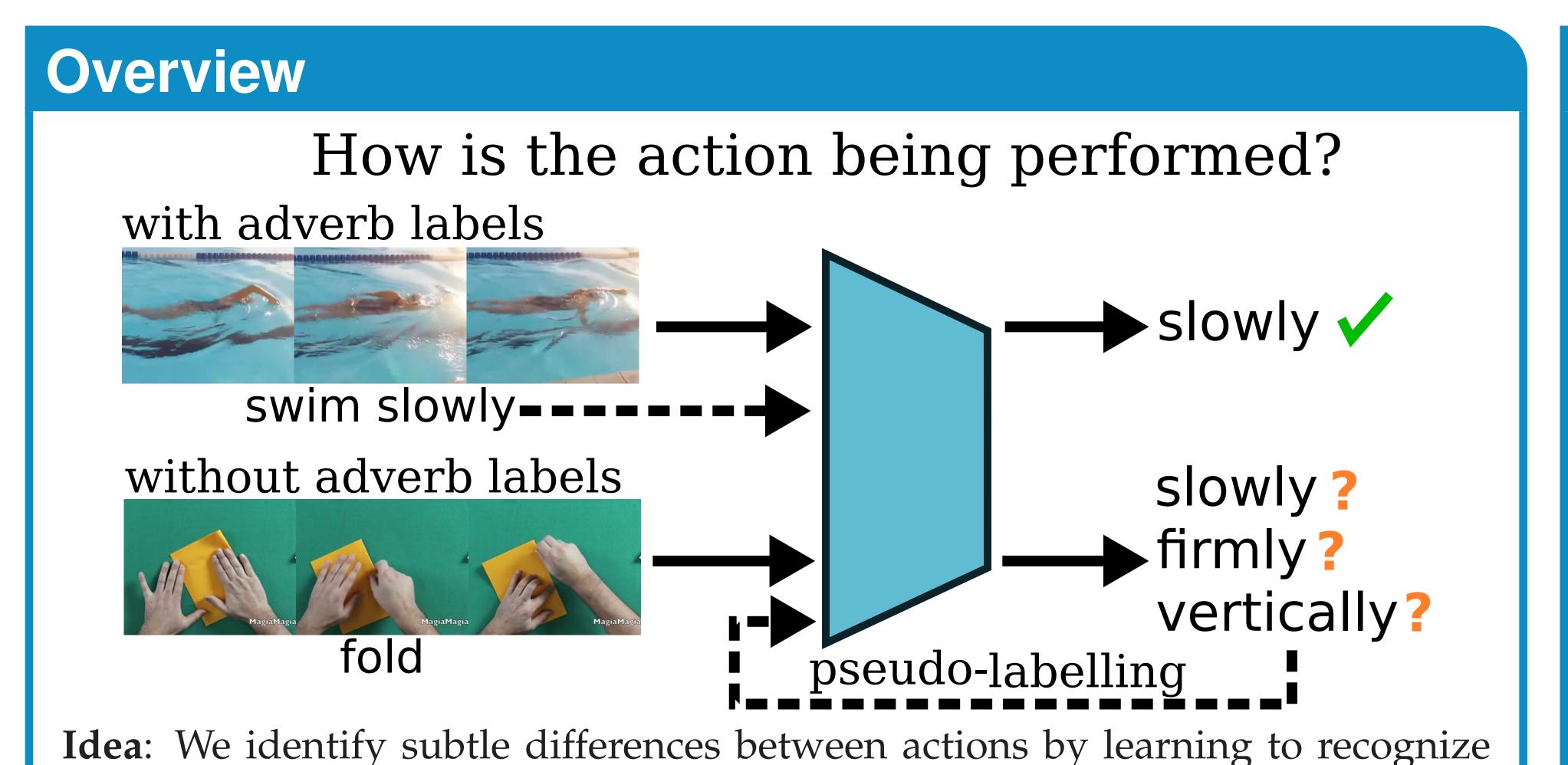


# How Do You Do It? Fine-Grained Action Understanding with Pseudo-Adverbs

University of Amsterdam





adverbs in a semi-supervised manner where we use action-only videos with

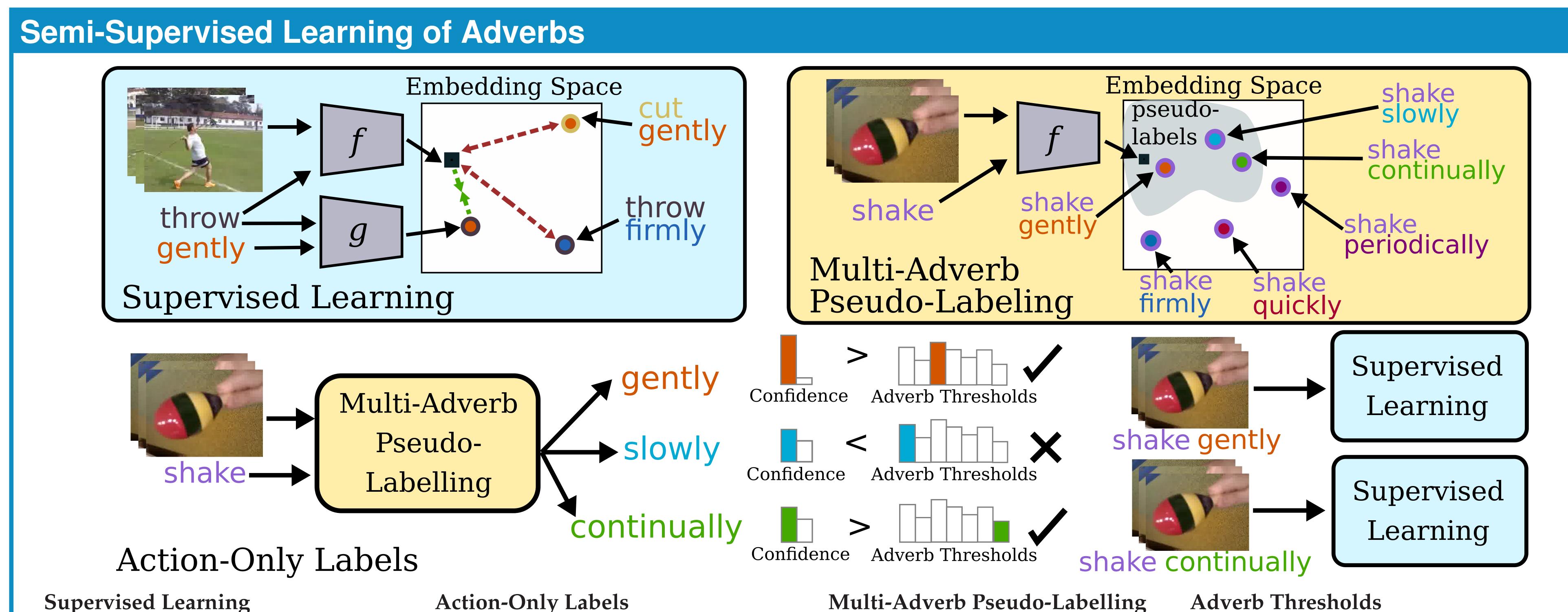
### **Three New Adverb Datasets**

multi-adverb pseudo-labeling.

	Adverbs & Actions			Videos	
Dataset	Adverbs	Actions	Pairs	Clips	Length
HowTo100M Adverbs [1]	6	72	263	5,824	20.0
VATEX Adverbs	34	135	1,550	14,617	10.0
MSR-VTT Adverbs	18	106	464	1,824	15.7
ActivityNet Adverbs	20	114	643	3,099	37.3

Three new adverb datasets available at:





Multiple adverbs can apply to an

action, thus we take the top-k

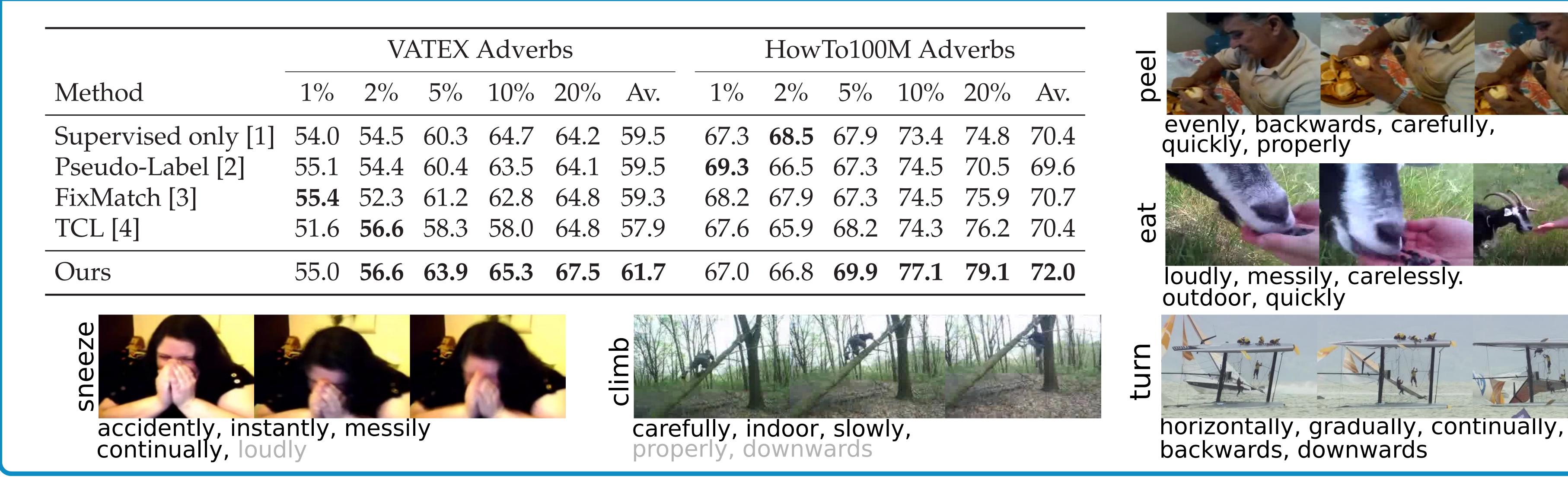
adverbs as pseudo-labels.

## Task I: Seen Compositions

Video parts relevant to the action

are embedded close to the ground-

truth action-adverb text embedding.



For videos without adverb labels

and use these in supervised learning

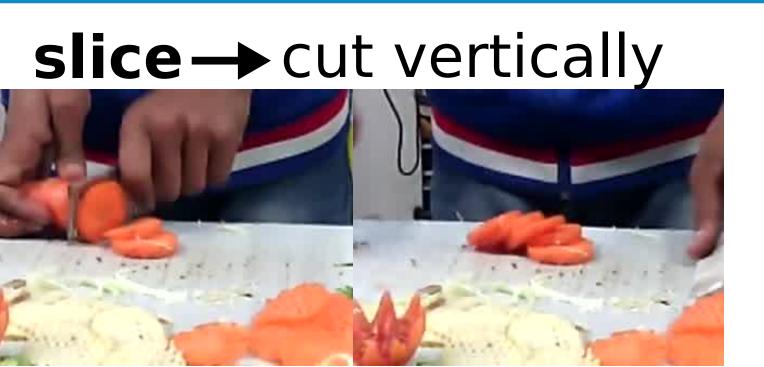
we create adverb pseudo-labels

Hazel Doughty and Cees G. M. Snoek







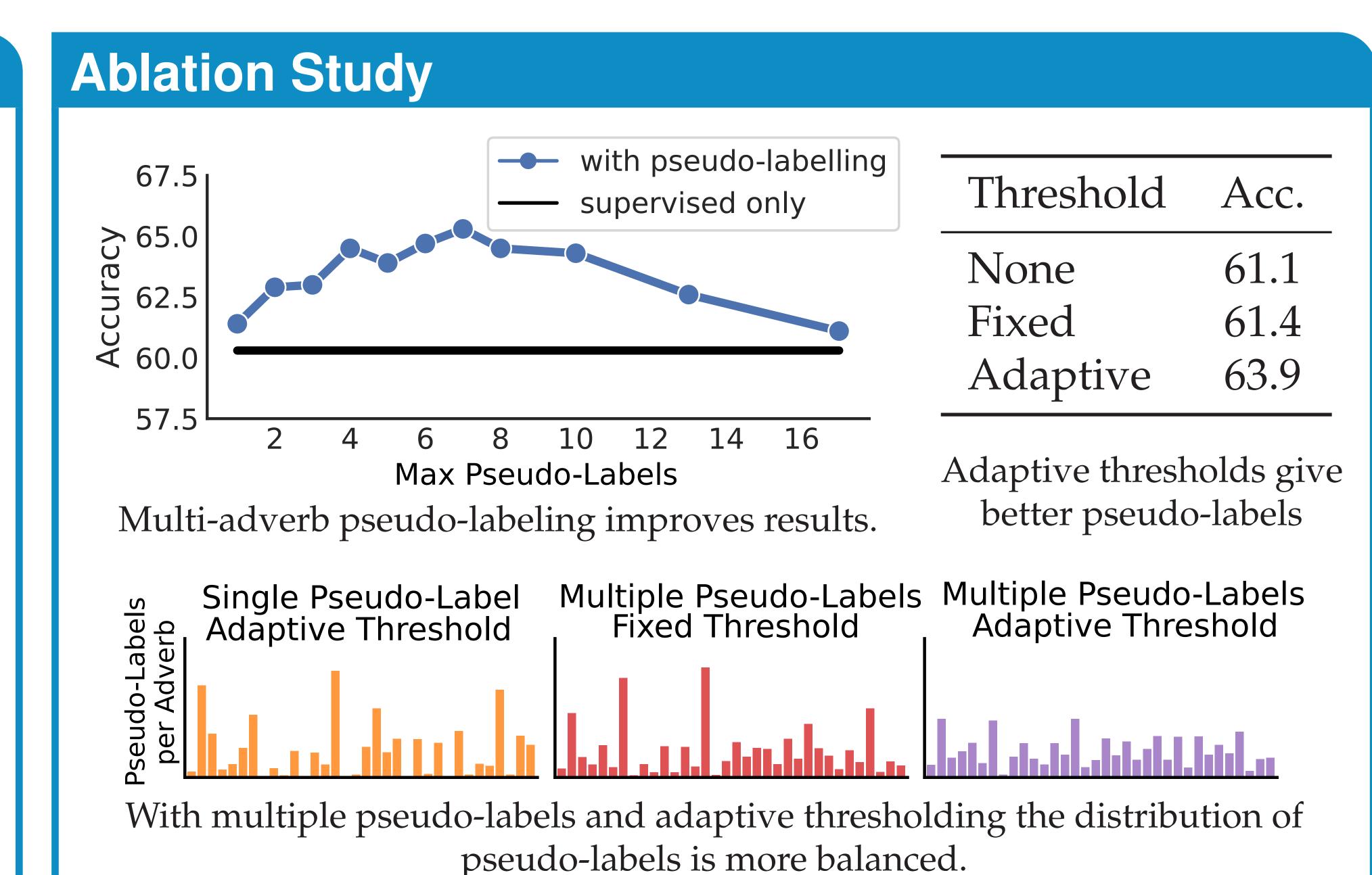


To cope with the long-tail,

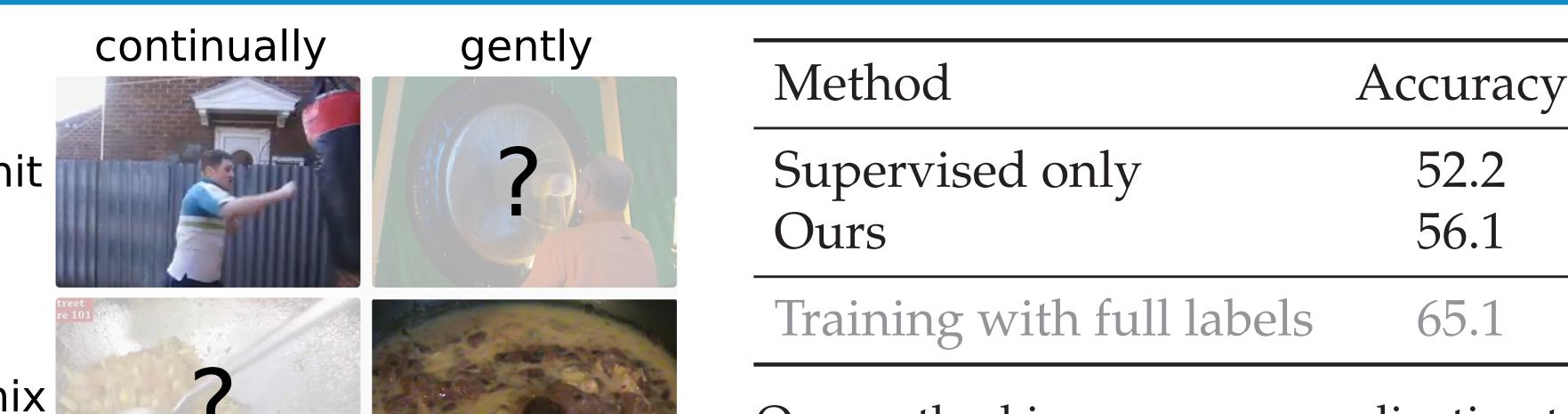
we use per-adverb thresholds to

select which pseudo-labels we use.





#### Task II: Unseen Compositions



Our method improves generalization to unseen action-adverb compositions.

#### Task III: Unseen Domains



Γ	push forward	_
	flip quickly	
	flip quickly	

Method	MSR-VTT Adverbs	ActivityNet Adverbs 67.2 66.4 66.6	
Source only Pseudo-Label Ours	62.9 63.9 65.0		
Source + Target Target only	67.5 70.5	71.6 71.8	

Our method aids generalization to similar domains, but struggles with larger shifts.

#### References

flip quickly

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- [2] Dong-Hyun Lee et al. Pseudo-label: The simple and efficient semi-supervised learning method for deep neural networks. In ICML Workshops, 2013.
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