**BCE LOSS:**

**# BASELINE - Next Item training**

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.5556

HR@10 Test Average: 0.8164

Sequence\_Score@10 Test Average: 0.5278

HT\_Ordered@10 Test Average: 0.6721

Kendall's Tau Test Average: 0.1450

Position in future Test\_NDCG Test\_HR Test\_

1 0.6404 0.8827

2 0.6053 0.8562

3 0.5850 0.8410

4 0.5518 0.8132

5 0.5257 0.7898

6 0.4993 0.7750

7 0.4816 0.7566

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**# INDEPENDENT FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating over all k-steps into the future:

NDCG@10 Test Average: 0.3482

HR@10 Test Average: 0.6884

Kendall's Tau Average: 0.1156

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.5226

HR@10 Test Average: 0.7929

Sequence\_Score@10 Test Average: 0.5087

HT\_Ordered@10 Test Average: 0.6508

Kendall's Tau Average: 0.1061

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_Score

1 0.5852 0.8439 0.6193 0.7316

2 0.5641 0.8269 0.6276 0.7273

3 0.5416 0.8150 0.5963 0.7056

4 0.5213 0.7900 0.5317 0.6609

5 0.4999 0.7746 0.4677 0.6211

6 0.4807 0.7553 0.3969 0.5761

7 0.4657 0.7448 0.3218 0.5333

Execution time: 0.08261990547180176 seconds

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**# TEACHER FORCING FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 80

NDCG@10 Test Average: 0.5582

HR@10 Test Average: 0.8193

Sequence\_Score@10 Test Average: 0.5313

HT\_Ordered@10 Test Average: 0.6753

Kendall's Tau Test Average: 0.1467

NDCG@10 Valid Average: 0.5671

HR@10 Valid Average: 0.8277

Sequence\_Score@10 Valid Average: 0.5342

HT\_Ordered@10 Valid Average: 0.6810

Kendall's Tau Valid Average: 0.1342

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6435 0.8843 0.6874 0.7858 0.6423 0.8816 0.6861 0.7839

2 0.6090 0.8591 0.6644 0.7617 0.6151 0.8669 0.6719 0.7694

3 0.5881 0.8465 0.6214 0.7340 0.5898 0.8506 0.6225 0.7366

4 0.5549 0.8152 0.5488 0.6820 0.5697 0.8356 0.5592 0.6974

5 0.5263 0.7917 0.4707 0.6312 0.5403 0.8041 0.4794 0.6418

6 0.5031 0.7787 0.4029 0.5908 0.5215 0.7881 0.3969 0.5925

7 0.4826 0.7596 0.3238 0.5417 0.4907 0.7672 0.3234 0.5453

**# ALL ACTION**

Evaluation statistics when evaluating over all k-steps into the future:

NDCG@10 Test Average: 0.2891

HR@10 Test Average: 0.5654

Kendall's Tau Average: 0.0914

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.4101

HR@10 Test Average: 0.6576

Sequence\_Score@10 Test Average: 0.4160

HT\_Ordered@10 Test Average: 0.5368

Kendall's Tau Average: 0.0917

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_Score

1 0.4658 0.7136 0.4846 0.5991

2 0.4499 0.6921 0.4932 0.5926

3 0.4289 0.6740 0.4760 0.5750

4 0.4102 0.6638 0.4428 0.5533

5 0.3818 0.6354 0.3939 0.5146

6 0.3751 0.6159 0.3353 0.4756

7 0.3589 0.6085 0.2863 0.4474

16 SAMPLES ALL ACTION

NDCG@10 Test Average: 0.4267

HR@10 Test Average: 0.6827

Sequence\_Score@10 Test Average: 0.4303

HT\_Ordered@10 Test Average: 0.5565

Kendall's Tau Test Average: 0.0857

**# DENSE ALL ACTION**

Evaluation statistics when evaluating over all k-steps into the future:

NDCG@10 Test Average: 0.2110

HR@10 Test Average: 0.4328

Kendall's Tau Average: 0.0528

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.2853

HR@10 Test Average: 0.5184

Sequence\_Score@10 Test Average: 0.3166

HT\_Ordered@10 Test Average: 0.4175

Kendall's Tau Test Average: 0.0492

Position in future Test\_NDCG Test\_HR Test\_Sequence\_Score Test\_HT\_Ordered\_Score

1 0.3044 0.5390 0.2988 0.4189 0.3532

2 0.3063 0.5422 0.3368 0.4395 0.3436

3 0.2933 0.5301 0.3567 0.4434 0.3357

4 0.2823 0.5199 0.3443 0.4321 0.3316

5 0.2761 0.5051 0.3236 0.4143 0.3254

6 0.2704 0.5008 0.2967 0.3987 0.3160

7 0.2644 0.4919 0.2596 0.3757 0.3000

**# SUPER DENSE ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 80

NDCG@10 Test Average: 0.2961

HR@10 Test Average: 0.5397

Sequence\_Score@10 Test Average: 0.3254

HT\_Ordered@10 Test Average: 0.4326

Kendall's Tau Test Average: 0.0434

NDCG@10 Valid Average: 0.3212

HR@10 Valid Average: 0.5805

Sequence\_Score@10 Valid Average: 0.3542

HT\_Ordered@10 Valid Average: 0.4674

Kendall's Tau Valid Average: 0.0407

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.3136 0.5635 0.3041 0.4338 0.3379 0.6083 0.3369 0.4726

2 0.3117 0.5633 0.3489 0.4561 0.3306 0.5863 0.3687 0.4775

3 0.3062 0.5553 0.3633 0.4593 0.3258 0.5816 0.3884 0.4850

4 0.2917 0.5336 0.3552 0.4444 0.3270 0.5849 0.3858 0.4854

5 0.2814 0.5244 0.3371 0.4307 0.3145 0.5683 0.3622 0.4652

6 0.2891 0.5216 0.3013 0.4115 0.3130 0.5765 0.3426 0.4595

7 0.2793 0.5164 0.2679 0.3921 0.2998 0.5577 0.2948 0.4262

**SAMPLED SOFTMAX LOSS**

**BASELINE**

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.5557

HR@10 Test Average: 0.8055

Sequence\_Score@10 Test Average: 0.5211

HT\_Ordered@10 Test Average: 0.6633

Kendall's Tau Test Average: 0.1501

NDCG@10 Valid Average: 0.5646

HR@10 Valid Average: 0.8154

Sequence\_Score@10 Valid Average: 0.5252

HT\_Ordered@10 Valid Average: 0.6703

Kendall's Tau Valid Average: 0.1311

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6424 0.8734 0.6834 0.7784 0.6434 0.8767 0.6797 0.7782

2 0.6162 0.8536 0.6633 0.7585 0.6126 0.8471 0.6646 0.7558

3 0.5845 0.8254 0.6042 0.7148 0.5854 0.8362 0.6160 0.7261

4 0.5495 0.8052 0.5374 0.6713 0.5682 0.8223 0.5461 0.6842

5 0.5214 0.7768 0.4617 0.6192 0.5354 0.7922 0.4664 0.6293

6 0.4953 0.7620 0.3920 0.5770 0.5210 0.7789 0.3912 0.5850

7 0.4807 0.7422 0.3060 0.5241 0.4864 0.7547 0.3122 0.5334

**# INDEPENDENT FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 100

NDCG@10 Test Average: 0.5609

HR@10 Test Average: 0.8115

Sequence\_Score@10 Test Average: 0.5234

HT\_Ordered@10 Test Average: 0.6675

Kendall's Tau Test Average: 0.1356

NDCG@10 Valid Average: 0.5668

HR@10 Valid Average: 0.8178

Sequence\_Score@10 Valid Average: 0.5227

HT\_Ordered@10 Valid Average: 0.6702

Kendall's Tau Valid Average: 0.1094

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6418 0.8712 0.6814 0.7763 0.6374 0.8647 0.6763 0.7705

2 0.6094 0.8478 0.6569 0.7523 0.6059 0.8490 0.6574 0.7532

3 0.5896 0.8339 0.6141 0.7240 0.5847 0.8419 0.6129 0.7274

4 0.5552 0.8106 0.5433 0.6770 0.5694 0.8261 0.5500 0.6881

5 0.5297 0.7846 0.4624 0.6235 0.5391 0.7935 0.4653 0.6294

6 0.5105 0.7731 0.3904 0.5817 0.5297 0.7916 0.3974 0.5945

7 0.4902 0.7596 0.3153 0.5374 0.5015 0.7574 0.2998 0.5286

**# TEACHER FORCING FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 100

NDCG@10 Test Average: 0.5660

HR@10 Test Average: 0.8161

Sequence\_Score@10 Test Average: 0.5272

HT\_Ordered@10 Test Average: 0.6717

Kendall's Tau Test Average: 0.1509

NDCG@10 Valid Average: 0.5767

HR@10 Valid Average: 0.8249

Sequence\_Score@10 Valid Average: 0.5325

HT\_Ordered@10 Valid Average: 0.6787

Kendall's Tau Valid Average: 0.1321

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6502 0.8819 0.6906 0.7862 0.6575 0.8810 0.7007 0.7908

2 0.6177 0.8532 0.6638 0.7585 0.6208 0.8620 0.6768 0.7694

3 0.5990 0.8436 0.6176 0.7306 0.5978 0.8443 0.6217 0.7330

4 0.5640 0.8172 0.5467 0.6819 0.5800 0.8256 0.5500 0.6878

5 0.5351 0.7887 0.4652 0.6270 0.5488 0.8022 0.4723 0.6372

6 0.5103 0.7735 0.3929 0.5832 0.5285 0.7911 0.3948 0.5929

7 0.4859 0.7548 0.3137 0.5343 0.5038 0.7680 0.3113 0.5396

**# ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.4256

HR@10 Test Average: 0.6833

Sequence\_Score@10 Test Average: 0.4319

HT\_Ordered@10 Test Average: 0.5576

Kendall's Tau Test Average: 0.0888

NDCG@10 Valid Average: 0.4494

HR@10 Valid Average: 0.7138

Sequence\_Score@10 Valid Average: 0.4501

HT\_Ordered@10 Valid Average: 0.5820

Kendall's Tau Valid Average: 0.0781

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.4737 0.7370 0.4879 0.6125 0.5023 0.7653 0.5260 0.6456

2 0.4650 0.7170 0.5142 0.6156 0.4720 0.7316 0.5245 0.6281

3 0.4393 0.7021 0.4927 0.5974 0.4585 0.7202 0.5101 0.6151

4 0.4268 0.6814 0.4590 0.5702 0.4525 0.7210 0.4793 0.6002

5 0.4093 0.6667 0.4138 0.5402 0.4311 0.7020 0.4333 0.5676

6 0.3907 0.6439 0.3541 0.4990 0.4317 0.6960 0.3732 0.5346

7 0.3743 0.6350 0.3018 0.4684 0.3976 0.6604 0.3046 0.4825

**16 Neg SAMPLES ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future: 200 epochs

NDCG@10 Test Average: 0.4329

HR@10 Test Average: 0.6908

Sequence\_Score@10 Test Average: 0.4349

HT\_Ordered@10 Test Average: 0.5628

Kendall's Tau Test Average: 0.0895

NDCG@10 Valid Average: 0.4552

HR@10 Valid Average: 0.7186

Sequence\_Score@10 Valid Average: 0.4534

HT\_Ordered@10 Valid Average: 0.5860

Kendall's Tau Valid Average: 0.0781

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.4866 0.7488 0.5075 0.6281 0.5071 0.7699 0.5332 0.6516

2 0.4683 0.7225 0.5190 0.6208 0.4878 0.7468 0.5368 0.6418

3 0.4460 0.7058 0.4944 0.6001 0.4702 0.7332 0.5193 0.6262

4 0.4395 0.6997 0.4680 0.5839 0.4498 0.7107 0.4729 0.5918

5 0.4116 0.6682 0.4065 0.5374 0.4359 0.6968 0.4250 0.5609

6 0.3969 0.6508 0.3528 0.5018 0.4293 0.7020 0.3806 0.5413

7 0.3817 0.6400 0.2956 0.4678 0.4065 0.6705 0.3057 0.4881

**# All action Autoreg**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4214

HR@10 Test Average: 0.6763

Sequence\_Score@10 Test Average: 0.4225

HT\_Ordered@10 Test Average: 0.5494

Kendall's Tau Test Average: 0.0679

NDCG@10 Valid Average: 0.4406

HR@10 Valid Average: 0.7000

Sequence\_Score@10 Valid Average: 0.4391

HT\_Ordered@10 Valid Average: 0.5695

Kendall's Tau Valid Average: 0.0678

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.4614 0.7223 0.4806 0.6014 0.4873 0.7425 0.5058 0.6242

2 0.4446 0.7027 0.4942 0.5985 0.4687 0.7256 0.5152 0.6204

3 0.4406 0.6958 0.4820 0.5889 0.4463 0.7082 0.4969 0.6026

4 0.4195 0.6727 0.4523 0.5625 0.4395 0.6941 0.4614 0.5778

5 0.4046 0.6630 0.4095 0.5362 0.4172 0.6764 0.4170 0.5467

6 0.3931 0.6378 0.3438 0.4908 0.4236 0.6903 0.3741 0.5322

7 0.3857 0.6395 0.2946 0.4671 0.4015 0.6629 0.3030 0.4829

**# All action Teacher Forcing**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4694

HR@10 Test Average: 0.7235

Sequence\_Score@10 Test Average: 0.4614

HT\_Ordered@10 Test Average: 0.5924

Kendall's Tau Test Average: 0.1068

NDCG@10 Valid Average: 0.4798

HR@10 Valid Average: 0.7358

Sequence\_Score@10 Valid Average: 0.4679

HT\_Ordered@10 Valid Average: 0.6019

Kendall's Tau Valid Average: 0.0980

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5360 0.7781 0.5609 0.6695 0.5416 0.7862 0.5704 0.6783

2 0.5126 0.7631 0.5627 0.6629 0.5204 0.7666 0.5629 0.6648

3 0.4915 0.7455 0.5283 0.6369 0.4946 0.7612 0.5412 0.6512

4 0.4613 0.7201 0.4863 0.6032 0.4827 0.7384 0.4932 0.6158

5 0.4492 0.7068 0.4262 0.5665 0.4579 0.7134 0.4288 0.5711

6 0.4257 0.6834 0.3674 0.5254 0.4447 0.7055 0.3756 0.5406

7 0.4097 0.6673 0.2978 0.4826 0.4166 0.6792 0.3033 0.4912

**# All action T2V LogQ**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.2289

HR@10 Test Average: 0.4193

Sequence\_Score@10 Test Average: 0.2539

HT\_Ordered@10 Test Average: 0.3366

Kendall's Tau Test Average: 0.1626

NDCG@10 Valid Average: 0.3762

HR@10 Valid Average: 0.6353

Sequence\_Score@10 Valid Average: 0.3842

HT\_Ordered@10 Valid Average: 0.5097

Kendall's Tau Valid Average: 0.0282

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.2848 0.5098 0.2757 0.3927 0.3775 0.6488 0.3792 0.5140

2 0.2647 0.4759 0.2899 0.3829 0.3813 0.6448 0.4244 0.5346

3 0.2510 0.4557 0.2911 0.3734 0.3862 0.6567 0.4466 0.5517

4 0.2338 0.4273 0.2829 0.3551 0.3821 0.6298 0.4138 0.5218

5 0.2072 0.3841 0.2465 0.3153 0.3850 0.6429 0.3959 0.5194

6 0.1940 0.3632 0.2154 0.2893 0.3595 0.6089 0.3381 0.4735

7 0.1666 0.3191 0.1755 0.2473 0.3616 0.6149 0.2914 0.4532

**# All action T2V Uniform**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.1518

HR@10 Test Average: 0.2798

Sequence\_Score@10 Test Average: 0.1667

HT\_Ordered@10 Test Average: 0.2232

Kendall's Tau Test Average: 0.2492

NDCG@10 Valid Average: 0.3896

HR@10 Valid Average: 0.6817

Sequence\_Score@10 Valid Average: 0.4292

HT\_Ordered@10 Valid Average: 0.5554

Kendall's Tau Valid Average: 0.1371

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.2172 0.3945 0.2029 0.2987 0.4474 0.7512 0.4615 0.6063

2 0.1979 0.3602 0.2134 0.2868 0.4335 0.7463 0.4962 0.6213

3 0.1764 0.3218 0.2072 0.2645 0.4262 0.7230 0.4973 0.6101

4 0.1591 0.2825 0.1817 0.2321 0.3863 0.6725 0.4522 0.5623

5 0.1285 0.2377 0.1483 0.1930 0.3751 0.6635 0.4219 0.5427

6 0.1040 0.1980 0.1185 0.1582 0.3385 0.6146 0.3589 0.4868

7 0.0797 0.1637 0.0949 0.1293 0.3204 0.6005 0.3164 0.4585

**# DENSE ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future: - 40 EPOCHS

NDCG@10 Test Average: 0.3077

HR@10 Test Average: 0.5478

Sequence\_Score@10 Test Average: 0.3337

HT\_Ordered@10 Test Average: 0.4408

Kendall's Tau Test Average: 0.0466

NDCG@10 Valid Average: 0.3315

HR@10 Valid Average: 0.5841

Sequence\_Score@10 Valid Average: 0.3554

HT\_Ordered@10 Valid Average: 0.4697

Kendall's Tau Valid Average: 0.0408

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.3253 0.5681 0.3204 0.4443 0.3511 0.6131 0.3533 0.4832

2 0.3234 0.5689 0.3643 0.4666 0.3439 0.6028 0.3852 0.4940

3 0.3179 0.5613 0.3725 0.4669 0.3352 0.5941 0.3950 0.4946

4 0.3055 0.5451 0.3600 0.4525 0.3356 0.5909 0.3907 0.4908

5 0.2988 0.5377 0.3427 0.4402 0.3240 0.5686 0.3585 0.4635

6 0.2944 0.5286 0.3068 0.4177 0.3218 0.5640 0.3220 0.4430

7 0.2888 0.5249 0.2694 0.3971 0.3091 0.5550 0.2832 0.4191

**# SUPER DENSE ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 60

NDCG@10 Test Average: 0.3055

HR@10 Test Average: 0.5468

Sequence\_Score@10 Test Average: 0.3332

HT\_Ordered@10 Test Average: 0.4400

Kendall's Tau Test Average: 0.0486

NDCG@10 Valid Average: 0.3320

HR@10 Valid Average: 0.5849

Sequence\_Score@10 Valid Average: 0.3562

HT\_Ordered@10 Valid Average: 0.4706

Kendall's Tau Valid Average: 0.0428

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.3215 0.5653 0.3182 0.4417 0.3499 0.6072 0.3474 0.4773

2 0.3225 0.5687 0.3619 0.4653 0.3474 0.5985 0.3844 0.4915

3 0.3151 0.5581 0.3713 0.4647 0.3376 0.5982 0.3942 0.4962

4 0.3035 0.5470 0.3599 0.4535 0.3376 0.5911 0.3920 0.4916

5 0.2978 0.5368 0.3449 0.4409 0.3242 0.5740 0.3612 0.4676

6 0.2927 0.5264 0.3049 0.4156 0.3205 0.5735 0.3329 0.4532

7 0.2857 0.5253 0.2710 0.3982 0.3069 0.5520 0.2815 0.4168

**# Future Rolling Window**

Evaluation statistics when evaluating for each k-step into the future: - EPOCHS: 200

NDCG@10 Test Average: 0.2827

HR@10 Test Average: 0.5274

Sequence\_Score@10 Test Average: 0.3161

HT\_Ordered@10 Test Average: 0.4217

Kendall's Tau Test Average: 0.0360

NDCG@10 Valid Average: 0.2836

HR@10 Valid Average: 0.5315

Sequence\_Score@10 Valid Average: 0.3191

HT\_Ordered@10 Valid Average: 0.4253

Kendall's Tau Valid Average: 0.0290

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.2934 0.5427 0.2809 0.4118 0.2989 0.5553 0.2831 0.4192

2 0.2923 0.5416 0.3237 0.4326 0.2832 0.5273 0.3213 0.4243

3 0.2905 0.5396 0.3512 0.4454 0.2856 0.5371 0.3515 0.4443

4 0.2829 0.5266 0.3425 0.4346 0.2908 0.5420 0.3554 0.4487

5 0.2747 0.5155 0.3328 0.4242 0.2782 0.5175 0.3304 0.4240

6 0.2762 0.5151 0.3067 0.4109 0.2825 0.5292 0.3153 0.4223

7 0.2690 0.5110 0.2746 0.3928 0.2663 0.5118 0.2769 0.3943

**# Integrated All Action Prediction LogQ:**

Evaluation statistics when evaluating for each k-step into the future: 200 epoch

NDCG@10 Test Average: 0.5625

HR@10 Test Average: 0.8105

Sequence\_Score@10 Test Average: 0.5249

HT\_Ordered@10 Test Average: 0.6677

Kendall's Tau Test Average: 0.1459

NDCG@10 Valid Average: 0.5724

HR@10 Valid Average: 0.8200

Sequence\_Score@10 Valid Average: 0.5269

HT\_Ordered@10 Valid Average: 0.6734

Kendall's Tau Valid Average: 0.1314

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6505 0.8751 0.6946 0.7849 0.6508 0.8797 0.6882 0.7839

2 0.6154 0.8512 0.6665 0.7589 0.6199 0.8574 0.6719 0.7646

3 0.5878 0.8293 0.6088 0.7191 0.5932 0.8446 0.6198 0.7322

4 0.5574 0.8098 0.5427 0.6762 0.5721 0.8226 0.5463 0.6845

5 0.5317 0.7811 0.4592 0.6201 0.5480 0.7935 0.4620 0.6278

6 0.5070 0.7735 0.3923 0.5829 0.5249 0.7851 0.3960 0.5906

7 0.4875 0.7531 0.3102 0.5317 0.4980 0.7574 0.3037 0.5306

**# Integrated All Action Prediction Uniform:**

Evaluation statistics when evaluating for each k-step into the future: 200 epoch

NDCG@10 Test Average: 0.5664

HR@10 Test Average: 0.8160

Sequence\_Score@10 Test Average: 0.5256

HT\_Ordered@10 Test Average: 0.6708

Kendall's Tau Test Average: 0.1375

NDCG@10 Valid Average: 0.5720

HR@10 Valid Average: 0.8217

Sequence\_Score@10 Valid Average: 0.5253

HT\_Ordered@10 Valid Average: 0.6735

Kendall's Tau Valid Average: 0.1188

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6474 0.8788 0.6882 0.7835 0.6416 0.8761 0.6845 0.7803

2 0.6193 0.8569 0.6638 0.7604 0.6137 0.8563 0.6607 0.7585

3 0.5952 0.8400 0.6192 0.7296 0.5933 0.8462 0.6203 0.7332

4 0.5589 0.8167 0.5478 0.6823 0.5761 0.8242 0.5493 0.6868

5 0.5372 0.7896 0.4613 0.6255 0.5444 0.7995 0.4685 0.6340

6 0.5138 0.7733 0.3880 0.5807 0.5313 0.7889 0.3900 0.5895

7 0.4932 0.7570 0.3111 0.5340 0.5037 0.7604 0.3036 0.5320

**# Integrated All Action Prediction LogQ Seq Split:**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.5617

HR@10 Test Average: 0.8138

Sequence\_Score@10 Test Average: 0.5264

HT\_Ordered@10 Test Average: 0.6701

Kendall's Tau Test Average: 0.1483

NDCG@10 Valid Average: 0.5708

HR@10 Valid Average: 0.8204

Sequence\_Score@10 Valid Average: 0.5273

HT\_Ordered@10 Valid Average: 0.6738

Kendall's Tau Valid Average: 0.1343

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6491 0.8823 0.6895 0.7859 0.6477 0.8772 0.6870 0.7821

2 0.6164 0.8541 0.6650 0.7595 0.6175 0.8533 0.6669 0.7601

3 0.5925 0.8350 0.6082 0.7216 0.5931 0.8446 0.6123 0.7285

4 0.5552 0.8130 0.5463 0.6797 0.5780 0.8231 0.5488 0.6860

5 0.5339 0.7846 0.4604 0.6225 0.5381 0.7968 0.4725 0.6346

6 0.5034 0.7698 0.3940 0.5819 0.5288 0.7867 0.3905 0.5886

7 0.4816 0.7581 0.3213 0.5397 0.4926 0.7607 0.3133 0.5370

**# Integrated All Action Prediction Uniform Seq Split:**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.5656

HR@10 Test Average: 0.8152

Sequence\_Score@10 Test Average: 0.5254

HT\_Ordered@10 Test Average: 0.6703

Kendall's Tau Test Average: 0.1446

NDCG@10 Valid Average: 0.5714

HR@10 Valid Average: 0.8209

Sequence\_Score@10 Valid Average: 0.5257

HT\_Ordered@10 Valid Average: 0.6733

Kendall's Tau Valid Average: 0.1194

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6501 0.8797 0.6872 0.7834 0.6433 0.8742 0.6860 0.7801

2 0.6221 0.8595 0.6692 0.7644 0.6185 0.8587 0.6636 0.7611

3 0.5916 0.8417 0.6175 0.7296 0.5879 0.8419 0.6156 0.7288

4 0.5594 0.8078 0.5407 0.6743 0.5757 0.8275 0.5507 0.6891

5 0.5371 0.7900 0.4635 0.6268 0.5436 0.7984 0.4718 0.6351

6 0.5134 0.7798 0.3931 0.5864 0.5299 0.7829 0.3874 0.5852

7 0.4852 0.7481 0.3063 0.5272 0.5010 0.7628 0.3050 0.5339

**# CE OVER LOSS**

**# All action**

Evaluation statistics when evaluating for each k-step into the future: - Epoch 200

NDCG@10 Test Average: 0.4233

HR@10 Test Average: 0.6843

Sequence\_Score@10 Test Average: 0.4298

HT\_Ordered@10 Test Average: 0.5571

Kendall's Tau Test Average: 0.0873

NDCG@10 Valid Average: 0.4426

HR@10 Valid Average: 0.7099

Sequence\_Score@10 Valid Average: 0.4471

HT\_Ordered@10 Valid Average: 0.5785

Kendall's Tau Valid Average: 0.0763

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.4780 0.7427 0.4985 0.6206 0.4912 0.7626 0.5149 0.6387

2 0.4622 0.7262 0.5122 0.6192 0.4709 0.7368 0.5201 0.6284

3 0.4404 0.7060 0.4951 0.6006 0.4521 0.7240 0.5099 0.6169

4 0.4184 0.6817 0.4507 0.5662 0.4496 0.7148 0.4805 0.5976

5 0.4032 0.6610 0.4067 0.5339 0.4272 0.6873 0.4219 0.5546

6 0.3901 0.6456 0.3508 0.4982 0.4123 0.6764 0.3688 0.5226

7 0.3711 0.6274 0.2946 0.4610 0.3947 0.6675 0.3137 0.4906

**# All action Masking 15%**

Evaluation statistics when evaluating for each k-step into the future: 150 EPOCHS

NDCG@10 Test Average: 0.4234

HR@10 Test Average: 0.6845

Sequence\_Score@10 Test Average: 0.4310

HT\_Ordered@10 Test Average: 0.5578

Kendall's Tau Test Average: 0.0893

NDCG@10 Valid Average: 0.4396

HR@10 Valid Average: 0.7051

Sequence\_Score@10 Valid Average: 0.4457

HT\_Ordered@10 Valid Average: 0.5754

Kendall's Tau Valid Average: 0.0805

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.4750 0.7309 0.4899 0.6104 0.4904 0.7601 0.5145 0.6373

2 0.4579 0.7229 0.5115 0.6172 0.4715 0.7319 0.5229 0.6274

3 0.4426 0.7077 0.4960 0.6019 0.4503 0.7207 0.5075 0.6141

4 0.4228 0.6916 0.4628 0.5772 0.4383 0.7031 0.4759 0.5895

5 0.4035 0.6588 0.4051 0.5320 0.4204 0.6832 0.4247 0.5540

6 0.3899 0.6469 0.3557 0.5013 0.4165 0.6854 0.3732 0.5293

7 0.3722 0.6324 0.2963 0.4643 0.3899 0.6515 0.3011 0.4763

**# All action Autoreg**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4360

HR@10 Test Average: 0.7028

Sequence\_Score@10 Test Average: 0.4428

HT\_Ordered@10 Test Average: 0.5728

Kendall's Tau Test Average: 0.0811

NDCG@10 Valid Average: 0.4498

HR@10 Valid Average: 0.7208

Sequence\_Score@10 Valid Average: 0.4548

HT\_Ordered@10 Valid Average: 0.5878

Kendall's Tau Valid Average: 0.0694

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.4792 0.7414 0.5006 0.6210 0.4986 0.7699 0.5248 0.6474

2 0.4701 0.7375 0.5241 0.6308 0.4767 0.7482 0.5401 0.6441

3 0.4599 0.7277 0.5119 0.6198 0.4536 0.7283 0.5101 0.6192

4 0.4303 0.7010 0.4712 0.5861 0.4522 0.7213 0.4855 0.6034

5 0.4182 0.6834 0.4210 0.5522 0.4317 0.7028 0.4347 0.5687

6 0.4053 0.6714 0.3659 0.5187 0.4251 0.6979 0.3811 0.5395

7 0.3893 0.6571 0.3051 0.4811 0.4108 0.6770 0.3070 0.4920

**# All action Teacher Forcing**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4733

HR@10 Test Average: 0.7349

Sequence\_Score@10 Test Average: 0.4693

HT\_Ordered@10 Test Average: 0.6021

Kendall's Tau Test Average: 0.1072

NDCG@10 Valid Average: 0.4809

HR@10 Valid Average: 0.7461

Sequence\_Score@10 Valid Average: 0.4746

HT\_Ordered@10 Valid Average: 0.6103

Kendall's Tau Valid Average: 0.0950

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5388 0.7993 0.5680 0.6837 0.5411 0.8011 0.5710 0.6861

2 0.5154 0.7757 0.5745 0.6751 0.5169 0.7715 0.5679 0.6697

3 0.4914 0.7594 0.5466 0.6530 0.4955 0.7694 0.5467 0.6580

4 0.4745 0.7349 0.4931 0.6140 0.4779 0.7452 0.4979 0.6216

5 0.4467 0.7008 0.4260 0.5634 0.4679 0.7321 0.4460 0.5891

6 0.4325 0.6949 0.3722 0.5335 0.4454 0.7139 0.3813 0.5476

7 0.4139 0.6790 0.3044 0.4917 0.4216 0.6895 0.3113 0.5004

**# All action T2V**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.1540

HR@10 Test Average: 0.2805

Sequence\_Score@10 Test Average: 0.1679

HT\_Ordered@10 Test Average: 0.2242

Kendall's Tau Test Average: 0.2364

NDCG@10 Valid Average: 0.4051

HR@10 Valid Average: 0.6909

Sequence\_Score@10 Valid Average: 0.4337

HT\_Ordered@10 Valid Average: 0.5623

Kendall's Tau Valid Average: 0.1253

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.2184 0.3962 0.2137 0.3050 0.4624 0.7580 0.4747 0.6164

2 0.1984 0.3632 0.2188 0.2910 0.4466 0.7558 0.5061 0.6310

3 0.1791 0.3244 0.2074 0.2659 0.4383 0.7251 0.5044 0.6148

4 0.1614 0.2835 0.1838 0.2337 0.4045 0.6858 0.4558 0.5708

5 0.1276 0.2360 0.1484 0.1922 0.3918 0.6757 0.4226 0.5491

6 0.1073 0.1976 0.1144 0.1560 0.3525 0.6268 0.3633 0.4951

7 0.0856 0.1624 0.0888 0.1256 0.3395 0.6086 0.3093 0.4590

**# Future Rolling Window:**

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.2711

HR@10 Test Average: 0.5077

Sequence\_Score@10 Test Average: 0.3025

HT\_Ordered@10 Test Average: 0.4051

Kendall's Tau Test Average: 0.0345

NDCG@10 Valid Average: 0.2750

HR@10 Valid Average: 0.5204

Sequence\_Score@10 Valid Average: 0.3105

HT\_Ordered@10 Valid Average: 0.4154

Kendall's Tau Valid Average: 0.0305

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.2833 0.5264 0.2672 0.3968 0.2881 0.5363 0.2785 0.4074

2 0.2784 0.5188 0.3126 0.4157 0.2783 0.5311 0.3087 0.4199

3 0.2757 0.5144 0.3269 0.4207 0.2716 0.5153 0.3344 0.4249

4 0.2703 0.5018 0.3309 0.4163 0.2795 0.5319 0.3503 0.4411

5 0.2608 0.4997 0.3206 0.4101 0.2677 0.5148 0.3282 0.4215

6 0.2661 0.4969 0.2959 0.3964 0.2709 0.5023 0.3003 0.4013

7 0.2633 0.4960 0.2633 0.3796 0.2692 0.5107 0.2733 0.3920

**# Future Rolling Window Autoregr:**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.2711

HR@10 Test Average: 0.5076

Sequence\_Score@10 Test Average: 0.3047

HT\_Ordered@10 Test Average: 0.4062

Kendall's Tau Test Average: 0.0300

NDCG@10 Valid Average: 0.2894

HR@10 Valid Average: 0.5393

Sequence\_Score@10 Valid Average: 0.3227

HT\_Ordered@10 Valid Average: 0.4310

Kendall's Tau Valid Average: 0.0252

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.2854 0.5283 0.2720 0.4002 0.3105 0.5667 0.2924 0.4295

2 0.2769 0.5157 0.3167 0.4162 0.2899 0.5382 0.3267 0.4324

3 0.2766 0.5164 0.3348 0.4256 0.2877 0.5428 0.3504 0.4466

4 0.2678 0.5047 0.3318 0.4182 0.2950 0.5482 0.3574 0.4528

5 0.2624 0.4988 0.3208 0.4098 0.2763 0.5235 0.3390 0.4313

6 0.2696 0.5018 0.2985 0.4002 0.2903 0.5422 0.3233 0.4328

7 0.2594 0.4875 0.2582 0.3729 0.2762 0.5134 0.2694 0.3914

**# Future Rolling Window Teacher forcing:**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.2663

HR@10 Test Average: 0.5013

Sequence\_Score@10 Test Average: 0.2983

HT\_Ordered@10 Test Average: 0.3998

Kendall's Tau Test Average: 0.0357

NDCG@10 Valid Average: 0.2737

HR@10 Valid Average: 0.5190

Sequence\_Score@10 Valid Average: 0.3101

HT\_Ordered@10 Valid Average: 0.4145

Kendall's Tau Valid Average: 0.0292

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.2782 0.5240 0.2662 0.3951 0.2892 0.5403 0.2757 0.4080

2 0.2735 0.5138 0.3066 0.4102 0.2764 0.5211 0.3086 0.4148

3 0.2703 0.5092 0.3269 0.4181 0.2776 0.5221 0.3359 0.4290

4 0.2674 0.5010 0.3239 0.4124 0.2798 0.5325 0.3463 0.4394

5 0.2571 0.4875 0.3150 0.4012 0.2639 0.5102 0.3286 0.4194

6 0.2617 0.4893 0.2907 0.3900 0.2697 0.5113 0.3073 0.4093

7 0.2561 0.4840 0.2592 0.3716 0.2593 0.4952 0.2686 0.3819

**# Integrated All Action Prediction:**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4958

HR@10 Test Average: 0.7591

Sequence\_Score@10 Test Average: 0.4844

HT\_Ordered@10 Test Average: 0.6217

Kendall's Tau Test Average: 0.1082

NDCG@10 Valid Average: 0.5059

HR@10 Valid Average: 0.7730

Sequence\_Score@10 Valid Average: 0.4913

HT\_Ordered@10 Valid Average: 0.6322

Kendall's Tau Valid Average: 0.0974

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5594 0.8124 0.5919 0.7021 0.5598 0.8215 0.5916 0.7066

2 0.5406 0.7967 0.5923 0.6945 0.5368 0.7995 0.5923 0.6959

3 0.5164 0.7802 0.5574 0.6688 0.5300 0.7914 0.5688 0.6801

4 0.4944 0.7598 0.5110 0.6354 0.5076 0.7748 0.5217 0.6482

5 0.4729 0.7331 0.4421 0.5876 0.4910 0.7590 0.4567 0.6079

6 0.4489 0.7203 0.3821 0.5512 0.4703 0.7433 0.3904 0.5668

7 0.4383 0.7110 0.3137 0.5123 0.4455 0.7218 0.3176 0.5197

**# Integrated All Action Prediction Autoregressive:**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4928

HR@10 Test Average: 0.7609

Sequence\_Score@10 Test Average: 0.4864

HT\_Ordered@10 Test Average: 0.6236

Kendall's Tau Test Average: 0.1121

NDCG@10 Valid Average: 0.5049

HR@10 Valid Average: 0.7766

Sequence\_Score@10 Valid Average: 0.4927

HT\_Ordered@10 Valid Average: 0.6346

Kendall's Tau Valid Average: 0.0943

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5534 0.8174 0.5864 0.7019 0.5667 0.8346 0.5993 0.7169

2 0.5372 0.7946 0.5940 0.6943 0.5342 0.8096 0.5908 0.7002

3 0.5195 0.7898 0.5651 0.6775 0.5192 0.7892 0.5638 0.6765

4 0.4881 0.7611 0.5140 0.6376 0.5058 0.7748 0.5234 0.6491

5 0.4685 0.7333 0.4451 0.5892 0.4863 0.7571 0.4612 0.6092

6 0.4500 0.7240 0.3850 0.5545 0.4679 0.7411 0.3924 0.5668

7 0.4326 0.7062 0.3148 0.5105 0.4541 0.7300 0.3178 0.5239

**# Integrated All Action Prediction Teacher Forcing:**

NDCG@10 Test Average: 0.5183

HR@10 Test Average: 0.7800

Sequence\_Score@10 Test Average: 0.5009

HT\_Ordered@10 Test Average: 0.6405

Kendall's Tau Test Average: 0.1201

Valid

NDCG@10 Valid Average: 0.5238

HR@10 Valid Average: 0.7903

Sequence\_Score@10 Valid Average: 0.5044

HT\_Ordered@10 Valid Average: 0.6473

Kendall's Tau Valid Average: 0.1050

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5924 0.8393 0.6291 0.7342 0.5870 0.8468 0.6232 0.7350

2 0.5645 0.8202 0.6216 0.7209 0.5594 0.8231 0.6168 0.7200

3 0.5383 0.7928 0.5732 0.6830 0.5464 0.8115 0.5904 0.7010

4 0.5200 0.7887 0.5281 0.6584 0.5230 0.7903 0.5305 0.6604

5 0.4921 0.7527 0.4505 0.6016 0.5026 0.7702 0.4633 0.6167

6 0.4688 0.7385 0.3878 0.5632 0.4880 0.7539 0.3866 0.5702

7 0.4521 0.7277 0.3163 0.5220 0.4603 0.7362 0.3199 0.5281

**# Integrated All Action Prediction Seq split:**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4956

HR@10 Test Average: 0.7601

Sequence\_Score@10 Test Average: 0.4862

HT\_Ordered@10 Test Average: 0.6232

Kendall's Tau Test Average: 0.1099

NDCG@10 Valid Average: 0.5053

HR@10 Valid Average: 0.7735

Sequence\_Score@10 Valid Average: 0.4904

HT\_Ordered@10 Valid Average: 0.6319

Kendall's Tau Valid Average: 0.0881

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5586 0.8126 0.5878 0.7002 0.5580 0.8299 0.5916 0.7108

2 0.5398 0.8002 0.5987 0.6995 0.5393 0.7935 0.5957 0.6946

3 0.5200 0.7850 0.5631 0.6740 0.5242 0.7897 0.5644 0.6771

4 0.4955 0.7640 0.5159 0.6399 0.5037 0.7751 0.5223 0.6487

5 0.4671 0.7286 0.4417 0.5851 0.4892 0.7582 0.4563 0.6073

6 0.4506 0.7212 0.3815 0.5513 0.4679 0.7444 0.3926 0.5685

7 0.4375 0.7094 0.3148 0.5121 0.4547 0.7234 0.3099 0.5167

**Window 3**

**Baseline:**

**SS Uniform**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.6349

HR@10 Test Average: 0.8656

Sequence\_Score@10 Test Average: 0.4093

HT\_Ordered@10 Test Average: 0.6375

Kendall's Tau Test Average: 0.1034

NDCG@10 Valid Average: 0.6403

HR@10 Valid Average: 0.8725

Sequence\_Score@10 Valid Average: 0.4115

HT\_Ordered@10 Valid Average: 0.6420

Kendall's Tau Valid Average: 0.0895

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6706 0.8874 0.4802 0.6838 0.6753 0.8961 0.4771 0.6866

2 0.6336 0.8685 0.4238 0.6462 0.6359 0.8682 0.4326 0.6504

3 0.6006 0.8409 0.3239 0.5824 0.6096 0.8533 0.3247 0.5890

**CE**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.6281

HR@10 Test Average: 0.8689

Sequence\_Score@10 Test Average: 0.4054

HT\_Ordered@10 Test Average: 0.6371

Kendall's Tau Test Average: 0.0973

NDCG@10 Valid Average: 0.6312

HR@10 Valid Average: 0.8727

Sequence\_Score@10 Valid Average: 0.4102

HT\_Ordered@10 Valid Average: 0.6415

Kendall's Tau Valid Average: 0.0865

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6608 0.8879 0.4599 0.6739 0.6606 0.8908 0.4648 0.6778

2 0.6242 0.8680 0.4269 0.6475 0.6301 0.8727 0.4321 0.6524

3 0.5993 0.8507 0.3294 0.5900 0.6030 0.8548 0.3337 0.5942

**Combo:**

**SS Uniform**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.6363

HR@10 Test Average: 0.8661

Sequence\_Score@10 Test Average: 0.4125

HT\_Ordered@10 Test Average: 0.6393

Kendall's Tau Test Average: 0.0934

NDCG@10 Valid Average: 0.6426

HR@10 Valid Average: 0.8764

Sequence\_Score@10 Valid Average: 0.4196

HT\_Ordered@10 Valid Average: 0.6480

Kendall's Tau Valid Average: 0.0770

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6695 0.8854 0.4867 0.6861 0.6719 0.8932 0.4770 0.6851

2 0.6328 0.8682 0.4242 0.6462 0.6398 0.8736 0.4424 0.6580

3 0.6064 0.8447 0.3266 0.5857 0.6161 0.8625 0.3394 0.6010

**CE**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.5631

HR@10 Test Average: 0.8238

Sequence\_Score@10 Test Average: 0.3238

HT\_Ordered@10 Test Average: 0.5738

Kendall's Tau Test Average: 0.0733

NDCG@10 Valid Average: 0.5706

HR@10 Valid Average: 0.8350

Sequence\_Score@10 Valid Average: 0.3290

HT\_Ordered@10 Valid Average: 0.5820

Kendall's Tau Valid Average: 0.0633

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5916 0.8382 0.3453 0.5918 0.5974 0.8590 0.3353 0.5972

2 0.5612 0.8293 0.3375 0.5834 0.5664 0.8260 0.3589 0.5924

3 0.5366 0.8040 0.2887 0.5463 0.5479 0.8199 0.2927 0.5563

**Window 10**

**Baseline:**

**SS Uniform**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.5173

HR@10 Test Average: 0.7725

Sequence\_Score@10 Test Average: 0.5136

HT\_Ordered@10 Test Average: 0.6431

Kendall's Tau Test Average: 0.1676

NDCG@10 Valid Average: 0.5304

HR@10 Valid Average: 0.7858

Sequence\_Score@10 Valid Average: 0.5193

HT\_Ordered@10 Valid Average: 0.6525

Kendall's Tau Valid Average: 0.1518

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6299 0.8651 0.7284 0.7967 0.6390 0.8721 0.7368 0.8044

2 0.6057 0.8501 0.7118 0.7810 0.6037 0.8402 0.7102 0.7752

3 0.5741 0.8150 0.6613 0.7382 0.5806 0.8361 0.6799 0.7580

4 0.5440 0.8001 0.6126 0.7063 0.5666 0.8156 0.6243 0.7200

5 0.5172 0.7721 0.5545 0.6633 0.5339 0.7895 0.5621 0.6758

6 0.4982 0.7619 0.5006 0.6312 0.5174 0.7780 0.5062 0.6421

7 0.4849 0.7483 0.4396 0.5939 0.4794 0.7461 0.4413 0.5937

8 0.4690 0.7294 0.3720 0.5507 0.4774 0.7357 0.3732 0.5545

9 0.4380 0.7090 0.3160 0.5125 0.4643 0.7374 0.3163 0.5268

10 0.4118 0.6739 0.2397 0.4568 0.4422 0.7072 0.2424 0.4748

**CE**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.5109

HR@10 Test Average: 0.7750

Sequence\_Score@10 Test Average: 0.5165

HT\_Ordered@10 Test Average: 0.6457

Kendall's Tau Test Average: 0.1667

NDCG@10 Valid Average: 0.5254

HR@10 Valid Average: 0.7907

Sequence\_Score@10 Valid Average: 0.5237

HT\_Ordered@10 Valid Average: 0.6572

Kendall's Tau Valid Average: 0.1517

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6215 0.8685 0.7239 0.7962 0.6264 0.8731 0.7279 0.8005

2 0.5927 0.8456 0.7078 0.7767 0.6036 0.8502 0.7111 0.7807

3 0.5636 0.8215 0.6647 0.7431 0.5725 0.8392 0.6832 0.7612

4 0.5409 0.8080 0.6227 0.7153 0.5587 0.8237 0.6319 0.7278

5 0.5173 0.7783 0.5565 0.6674 0.5303 0.7999 0.5759 0.6879

6 0.4927 0.7667 0.5072 0.6370 0.5090 0.7868 0.5186 0.6527

7 0.4771 0.7494 0.4446 0.5970 0.4871 0.7535 0.4437 0.5986

8 0.4607 0.7299 0.3802 0.5551 0.4694 0.7367 0.3780 0.5574

9 0.4300 0.7019 0.3114 0.5067 0.4594 0.7357 0.3192 0.5275

10 0.4121 0.6801 0.2460 0.4631 0.4377 0.7079 0.2475 0.4777

**Combo:**

**SS Uniform**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.5227

HR@10 Test Average: 0.7783

Sequence\_Score@10 Test Average: 0.5169

HT\_Ordered@10 Test Average: 0.6476

Kendall's Tau Test Average: 0.1591

NDCG@10 Valid Average: 0.5335

HR@10 Valid Average: 0.7918

Sequence\_Score@10 Valid Average: 0.5207

HT\_Ordered@10 Valid Average: 0.6562

Kendall's Tau Valid Average: 0.1407

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6304 0.8586 0.7250 0.7918 0.6217 0.8620 0.7239 0.7930

2 0.5993 0.8396 0.7059 0.7728 0.6030 0.8459 0.7126 0.7792

3 0.5765 0.8193 0.6652 0.7423 0.5812 0.8355 0.6731 0.7543

4 0.5478 0.7992 0.6148 0.7070 0.5685 0.8274 0.6318 0.7296

5 0.5244 0.7794 0.5579 0.6687 0.5387 0.7861 0.5600 0.6730

6 0.5089 0.7746 0.5087 0.6417 0.5221 0.7864 0.5122 0.6493

7 0.4923 0.7520 0.4384 0.5952 0.4985 0.7612 0.4443 0.6028

8 0.4797 0.7500 0.3853 0.5676 0.4792 0.7498 0.3853 0.5675

9 0.4488 0.7200 0.3169 0.5185 0.4713 0.7495 0.3228 0.5361

10 0.4191 0.6900 0.2508 0.4704 0.4503 0.7142 0.2408 0.4775

**CE**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4552

HR@10 Test Average: 0.7230

Sequence\_Score@10 Test Average: 0.4832

HT\_Ordered@10 Test Average: 0.6031

Kendall's Tau Test Average: 0.1224

NDCG@10 Valid Average: 0.4694

HR@10 Valid Average: 0.7375

Sequence\_Score@10 Valid Average: 0.4871

HT\_Ordered@10 Valid Average: 0.6123

Kendall's Tau Valid Average: 0.1064

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5446 0.8054 0.6423 0.7239 0.5437 0.8163 0.6434 0.7299

2 0.5136 0.7771 0.6327 0.7049 0.5197 0.7827 0.6355 0.7091

3 0.4892 0.7590 0.6088 0.6839 0.5107 0.7804 0.6218 0.7011

4 0.4827 0.7500 0.5746 0.6623 0.4942 0.7612 0.5879 0.6746

5 0.4608 0.7294 0.5294 0.6294 0.4752 0.7418 0.5381 0.6400

6 0.4459 0.7212 0.4847 0.6029 0.4579 0.7236 0.4832 0.6034

7 0.4303 0.7011 0.4288 0.5649 0.4350 0.7075 0.4328 0.5702

8 0.4162 0.6850 0.3718 0.5284 0.4206 0.6951 0.3731 0.5341

9 0.3937 0.6589 0.3076 0.4833 0.4265 0.6961 0.3132 0.5046

10 0.3748 0.6431 0.2510 0.4471 0.4105 0.6699 0.2418 0.4558

**Window 14**

**Baseline:**

**SS Uniform**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4717

HR@10 Test Average: 0.7258

Sequence\_Score@10 Test Average: 0.4814

HT\_Ordered@10 Test Average: 0.6036

Kendall's Tau Test Average: 0.1833

NDCG@10 Valid Average: 0.4876

HR@10 Valid Average: 0.7450

Sequence\_Score@10 Valid Average: 0.4895

HT\_Ordered@10 Valid Average: 0.6173

Kendall's Tau Valid Average: 0.1713

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6242 0.8604 0.7612 0.8108 0.6304 0.8670 0.7671 0.8170

2 0.5907 0.8323 0.7386 0.7854 0.5914 0.8355 0.7379 0.7867

3 0.5560 0.8045 0.6965 0.7505 0.5704 0.8248 0.7123 0.7685

4 0.5228 0.7782 0.6507 0.7144 0.5527 0.8071 0.6716 0.7393

5 0.5099 0.7625 0.6079 0.6852 0.5222 0.7743 0.6166 0.6954

6 0.4875 0.7490 0.5667 0.6579 0.5062 0.7729 0.5828 0.6779

7 0.4751 0.7336 0.5177 0.6257 0.4758 0.7344 0.5169 0.6256

8 0.4622 0.7163 0.4652 0.5907 0.4606 0.7193 0.4700 0.5946

9 0.4376 0.7009 0.4216 0.5613 0.4603 0.7220 0.4283 0.5751

10 0.4089 0.6600 0.3536 0.5068 0.4363 0.6980 0.3696 0.5338

11 0.4065 0.6675 0.3140 0.4908 0.4094 0.6727 0.3155 0.4941

12 0.3868 0.6435 0.2603 0.4519 0.4085 0.6749 0.2717 0.4733

13 0.3745 0.6345 0.2167 0.4256 0.4089 0.6754 0.2207 0.4481

14 0.3613 0.6176 0.1694 0.3935 0.3933 0.6519 0.1725 0.4122

**CE**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4670

HR@10 Test Average: 0.7322

Sequence\_Score@10 Test Average: 0.4872

HT\_Ordered@10 Test Average: 0.6097

Kendall's Tau Test Average: 0.1863

NDCG@10 Valid Average: 0.4869

HR@10 Valid Average: 0.7548

Sequence\_Score@10 Valid Average: 0.4974

HT\_Ordered@10 Valid Average: 0.6261

Kendall's Tau Valid Average: 0.1752

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6095 0.8574 0.7519 0.8046 0.6263 0.8723 0.7706 0.8214

2 0.5802 0.8386 0.7393 0.7890 0.5904 0.8466 0.7480 0.7973

3 0.5519 0.8105 0.7015 0.7560 0.5729 0.8350 0.7190 0.7770

4 0.5201 0.7857 0.6553 0.7205 0.5478 0.8062 0.6736 0.7399

5 0.5048 0.7700 0.6165 0.6932 0.5169 0.7836 0.6270 0.7053

6 0.4820 0.7572 0.5768 0.6670 0.5075 0.7778 0.5869 0.6824

7 0.4756 0.7512 0.5361 0.6437 0.4755 0.7450 0.5283 0.6366

8 0.4582 0.7253 0.4778 0.6016 0.4683 0.7455 0.4909 0.6182

9 0.4285 0.6946 0.4199 0.5572 0.4542 0.7348 0.4392 0.5870

10 0.4109 0.6822 0.3724 0.5273 0.4309 0.7082 0.3812 0.5447

11 0.3995 0.6709 0.3215 0.4962 0.4112 0.6723 0.3129 0.4926

12 0.3924 0.6529 0.2627 0.4578 0.4186 0.6891 0.2776 0.4834

13 0.3659 0.6308 0.2178 0.4243 0.4027 0.6834 0.2303 0.4568

14 0.3585 0.6236 0.1714 0.3975 0.3932 0.6670 0.1780 0.4225

**Combo:**

**SS Uniform**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4801

HR@10 Test Average: 0.7405

Sequence\_Score@10 Test Average: 0.4883

HT\_Ordered@10 Test Average: 0.6144

Kendall's Tau Test Average: 0.1658

NDCG@10 Valid Average: 0.4991

HR@10 Valid Average: 0.7580

Sequence\_Score@10 Valid Average: 0.4936

HT\_Ordered@10 Valid Average: 0.6258

Kendall's Tau Valid Average: 0.1542

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6096 0.8537 0.7506 0.8021 0.6212 0.8630 0.7603 0.8117

2 0.5849 0.8386 0.7406 0.7896 0.5895 0.8386 0.7353 0.7869

3 0.5597 0.8150 0.7028 0.7589 0.5771 0.8257 0.7140 0.7698

4 0.5351 0.7839 0.6557 0.7198 0.5542 0.8053 0.6718 0.7386

5 0.5203 0.7719 0.6145 0.6932 0.5357 0.7818 0.6193 0.7005

6 0.4878 0.7568 0.5744 0.6656 0.5185 0.7840 0.5896 0.6868

7 0.4849 0.7448 0.5243 0.6345 0.4924 0.7574 0.5338 0.6456

8 0.4682 0.7396 0.4870 0.6133 0.4805 0.7428 0.4824 0.6126

9 0.4512 0.7186 0.4293 0.5739 0.4718 0.7437 0.4402 0.5920

10 0.4191 0.6848 0.3715 0.5282 0.4508 0.7215 0.3828 0.5522

11 0.4264 0.6957 0.3244 0.5101 0.4351 0.6931 0.3163 0.5047

12 0.4037 0.6657 0.2664 0.4661 0.4261 0.6900 0.2693 0.4796

13 0.3945 0.6623 0.2207 0.4415 0.4281 0.6922 0.2224 0.4573

14 0.3762 0.6360 0.1740 0.4050 0.4064 0.6727 0.1725 0.4226

**CE**

Evaluation statistics when evaluating for each k-step into the future: 200

NDCG@10 Test Average: 0.4157

HR@10 Test Average: 0.6796

Sequence\_Score@10 Test Average: 0.4528

HT\_Ordered@10 Test Average: 0.5662

Kendall's Tau Test Average: 0.1311

NDCG@10 Valid Average: 0.4351

HR@10 Valid Average: 0.7011

Sequence\_Score@10 Valid Average: 0.4624

HT\_Ordered@10 Valid Average: 0.5818

Kendall's Tau Valid Average: 0.1191

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.5168 0.7824 0.6645 0.7234 0.5340 0.7987 0.6810 0.7398

2 0.4956 0.7640 0.6591 0.7115 0.5129 0.7778 0.6718 0.7248

3 0.4751 0.7430 0.6353 0.6891 0.4959 0.7596 0.6538 0.7067

4 0.4576 0.7137 0.5969 0.6553 0.4682 0.7357 0.6154 0.6756

5 0.4390 0.7043 0.5692 0.6367 0.4641 0.7255 0.5822 0.6539

6 0.4371 0.6991 0.5344 0.6167 0.4482 0.7171 0.5495 0.6333

7 0.4127 0.6833 0.4983 0.5908 0.4245 0.6931 0.5000 0.5965

8 0.4190 0.6863 0.4605 0.5734 0.4173 0.6812 0.4527 0.5669

9 0.3904 0.6503 0.4016 0.5259 0.4062 0.6798 0.4208 0.5503

10 0.3682 0.6330 0.3556 0.4943 0.4020 0.6678 0.3666 0.5172

11 0.3744 0.6371 0.3107 0.4739 0.3871 0.6483 0.3116 0.4800

12 0.3505 0.6113 0.2628 0.4370 0.3820 0.6479 0.2702 0.4590

13 0.3527 0.6139 0.2177 0.4158 0.3810 0.6452 0.2213 0.4333

14 0.3309 0.5929 0.1730 0.3829 0.3676 0.6377 0.1766 0.4072