Training step: 10k, Validation Perplexity: 8.61 out of 13 PHE TYR Amino acid group LEU MET 3 ILE VAL LYS ARG PYL **GLU GLN** ALA SER THR 2 **GLU GLN ASN ASP** ASN ASP PHE TYR CYS SEC 1 ALA SER THR **GLY** HIS PRO **PRO** GLY XAA ASX GLX 0 **TRP** LE VAL XAA ASX GLX LEU MET LYS ARG PYL CYS SEC -2 TRP HIS -33 -2

Training step: 20k, Validation Perplexity: 8.35 out of 13 PHE TYR Amino acid group LEU MET 3 ILE VAL LYS ARG PYL **GLU GLN** 2 ALA SER THR **GLU GLN ASN ASP** ASN ASP PHE TYR CYS SEC 1 ALA SER THR **GLY** PRO HIS **PRO** XAA ASX GLX GLY 0 **TRP** ILE VAL XAA ASX GLX LEU MET LYS ARG PYL CYS SEC -2 TRP -3HIS -23

Training step: 30k, Validation Perplexity: 8.12 out of 13 PHE TYR Amino acid group LEU MET 3 ILE VAL LYS ARG PYL **GLU GLN** 2 ALA SER THR **GLU GLN ASN ASP** A\$N ASP PHE TYR ALA SER THR CYS SEC 1 **GLY** PRO HIS XAA ASX GLX **PRO** 0 GLY **TRP** ILE VAL XAA ASX GLX LEU MET CYS SEC LYS ARG PYL -2 TRP -3HIS -2 3

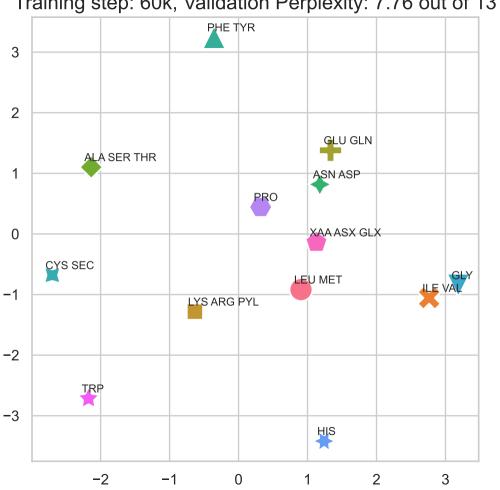
Training step: 40k, Validation Perplexity: 7.97 out of 13 HIS Amino acid group LEU MET TRP 3 ILE VAL LYS ARG PYL **GLU GLN** 2 ALA SER THR **ASN ASP** LYS ARG PYL PHE TYR CYS SEC 1 ILE VAL LEU MET CYS SEC **GLY** HIS XAA ASX GLX **PRO** 0 PRO **TRP** XAA ASX GLX ALA SER THR **ASN ASP** -1 **GLU GLN** -2 -3PHE TYR

-2

0

Training step: 50k, Validation Perplexity: 7.86 out of 13 PHE TYR Amino acid group LEU MET 3 ILE VAL LYS ARG PYL **GLU GLN** 2 ALA SER THR **GLU GLN ASN ASP** PHE TYR ALA SER THR ASN ASP 1 CYS SEC **GLY** PRO HIS XAA ASX GLX 0 **PRO TRP** GLY XAA ASX GLX CYS SEC LEU MET ILE VAL LYS ARG PYL -2 TRP -3HIS 2 -20

Training step: 60k, Validation Perplexity: 7.76 out of 13





Training step: 70k, Validation Perplexity: 8.26 out of 13 PHE TYR Amino acid group 3 ILE VAL 2 **GLU GLN** ALA SER THR 1 **ASN ASP** PRO **GLY** HIS 0 XAA ASX GLX **PRO** CYS SEC **TRP** 

LEU MET

HIS

LYS ARG PYL

0

-1

-2

-3

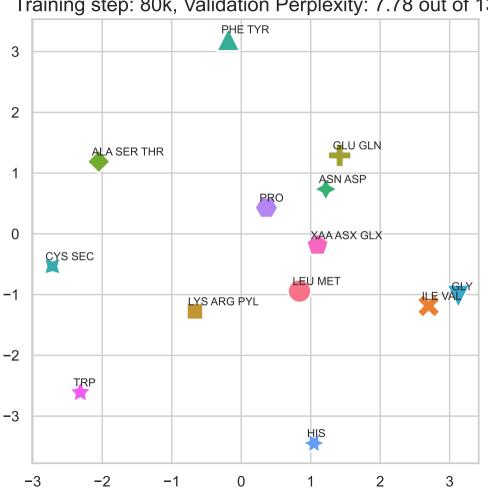
-3

TRP

-2



Training step: 80k, Validation Perplexity: 7.78 out of 13

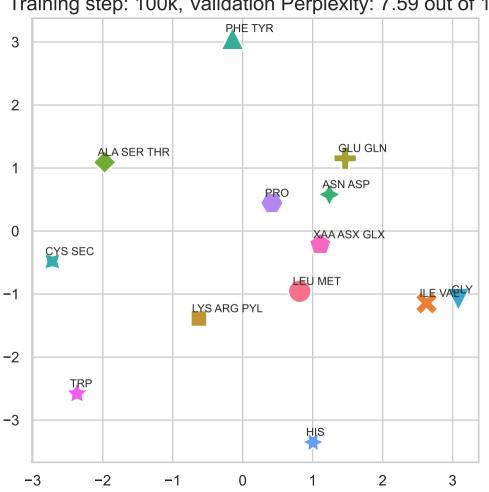




Training step: 90k, Validation Perplexity: 7.64 out of 13

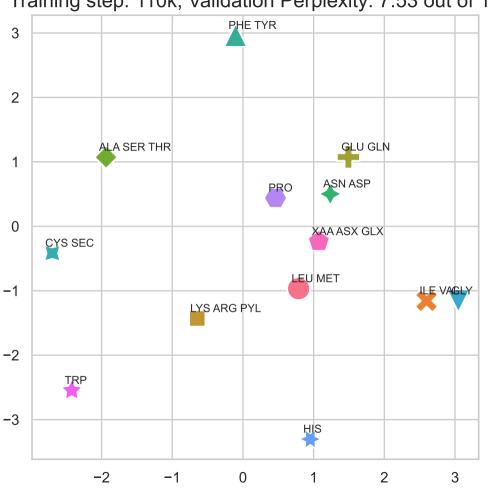


Training step: 100k, Validation Perplexity: 7.59 out of 13

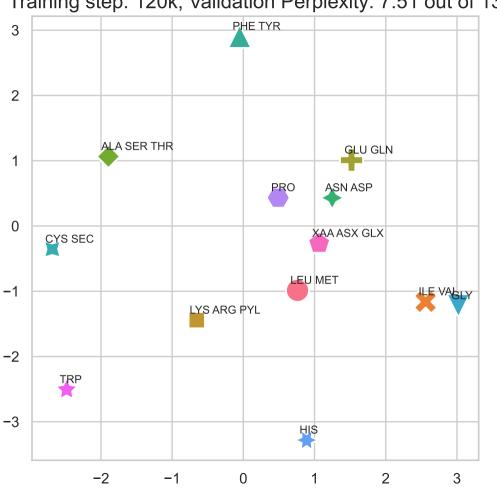




## Training step: 110k, Validation Perplexity: 7.53 out of 13



## Training step: 120k, Validation Perplexity: 7.51 out of 13





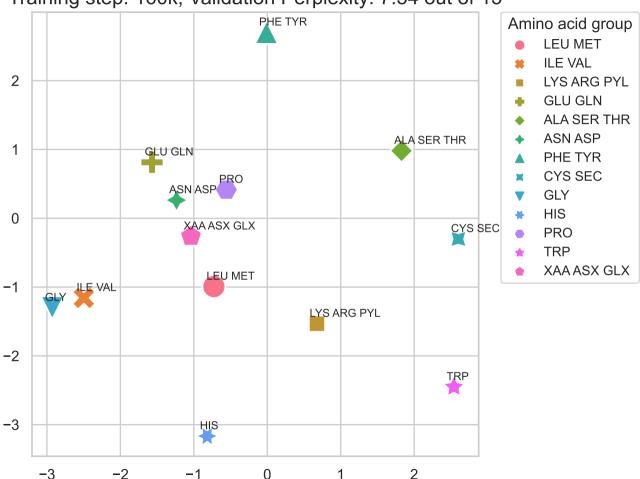
XAA ASX GLX

Training step: 130k, Validation Perplexity: 7.45 out of 13 3 PHE TYR Amino acid group LEU MET ILE VAL LYS ARG PYL 2 **GLU GLN** ALA SER THR **ASN ASP** ALA SER THR **GLU GLN** 1 PHE TYR CYS SEC ASN ASP PRO **GLY** HIS 0 CYS SEC XAA ASX GLX **PRO TRP** XAA ASX GLX LEU MET LYS ARG PYL -2 TRP -3HIS 2 -3-2

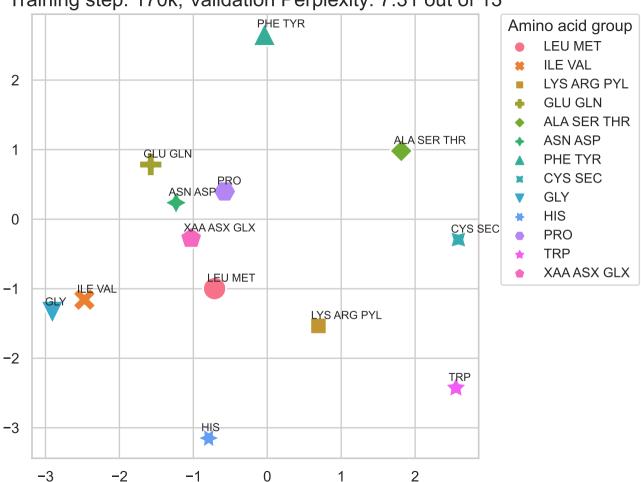
Training step: 140k, Validation Perplexity: 7.4 out of 13 3 PHE TYR Amino acid group LEU MET ILE VAL LYS ARG PYL 2 **GLU GLN** ALA SER THR **ASN ASP** ALA SER THR **GLU GLN** 1 PHE TYR CYS SEC ASN ASP PRO **GLY** HIS 0 XAA ASX GLX CYS SEC **PRO TRP** XAA ASX GLX LEU MET LYS ARG PYL -2 TRP -3HIS 2 -3-2

Training step: 150k, Validation Perplexity: 7.37 out of 13 3 PHE TYR Amino acid group LEU MET ILE VAL LYS ARG PYL 2 **GLU GLN** ALA SER THR **ASN ASP** ALA SER THR **GLU GLN** 1 PHE TYR CYS SEC ASN ASP PRO **GLY** HIS 0 CYS SEC XAA ASX GLX **PRO TRP** XAA ASX GLX LEU MET LYS ARG PYL -2 TRP -3HIS 2 -3-2 0

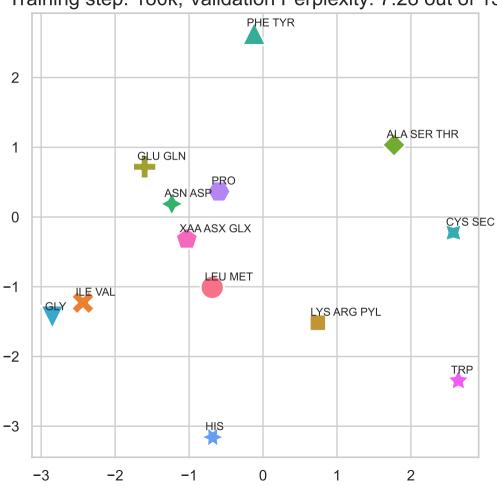
Training step: 160k, Validation Perplexity: 7.34 out of 13



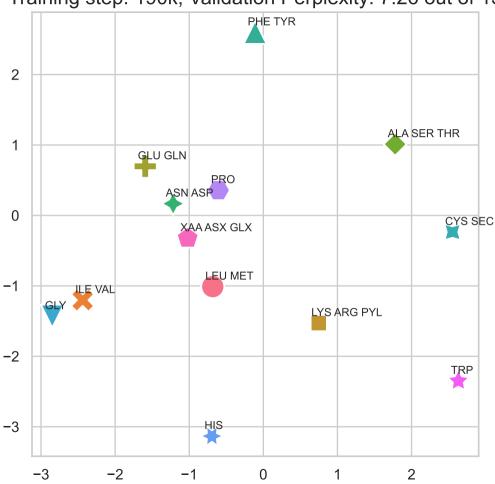
Training step: 170k, Validation Perplexity: 7.31 out of 13



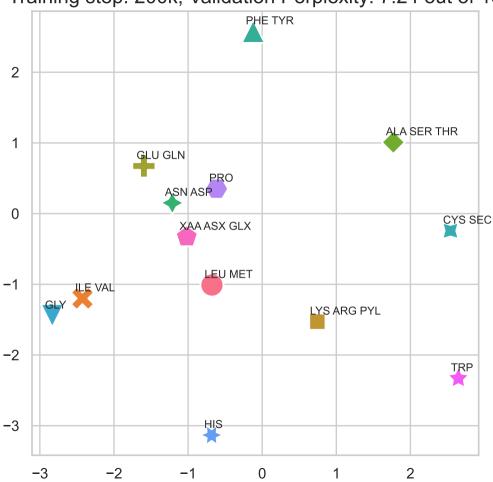
Training step: 180k, Validation Perplexity: 7.28 out of 13



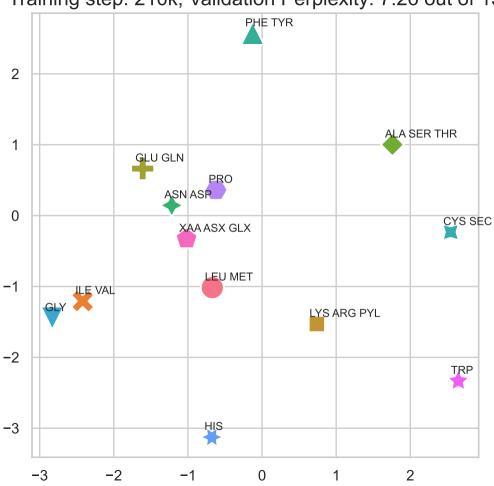
Training step: 190k, Validation Perplexity: 7.26 out of 13 PHE TYR



Training step: 200k, Validation Perplexity: 7.24 out of 13 PHE TYR



Training step: 210k, Validation Perplexity: 7.26 out of 13 PHE TYR

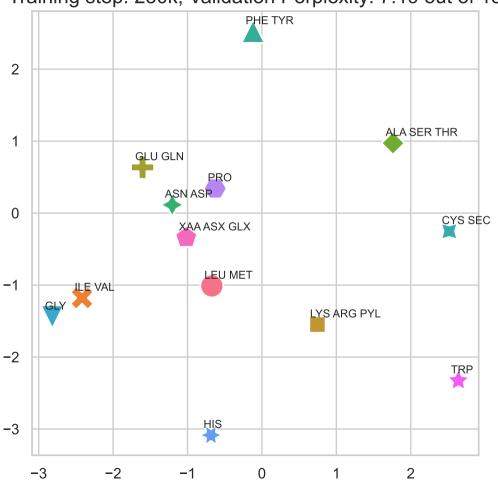


Training step: 220k, Validation Perplexity: 7.22 out of 13





Training step: 230k, Validation Perplexity: 7.19 out of 13



Training step: 240k, Validation Perplexity: 7.18 out of 13 PHE TYR Amino acid group LEU MET ILE VAL 2 LYS ARG PYL **GLU GLN** ALA SER THR ALA SER THR **ASN ASP** 1 **GLU GLN** PHE TYR CYS SEC PRO ASN ASP **GLY** 0 HIS CYS SEC XAA ASX GLX **PRO TRP** XAA ASX GLX LEU MET -1 ILE VAL LYS ARG PYL -2 TRP HIS -3

-3

-2

2