Literature on segregation Amsterdam

Boterman, W. R., Musterd, S., & Manting, D. (2021). Multiple dimensions of residential segregation. The case of the metropolitan area of Amsterdam. *Urban Geography*, *42*(4), 481-506.

Sleutjes, B., De Valk, H. A., & Ooijevaar, J. (2018). The measurement of ethnic segregation in the Netherlands: Differences between administrative and individualized neighbourhoods. *European Journal of Population*, *34*(2), 195-224.

Musterd, S. (2003). Segregation and integration: a contested relationship. *Journal of ethnic and migration studies*, *29*(4), 623-641.

Segregation index metropolitan Amsterdam

Migration background		
Native-Dutch	0.31	0.31
Moroccan	0.52	0.49
Turkish	0.51	0.49
Surinamese	0.45	0.42
Antillean	0.35	0.31
Other non-western	0.31	0.28
Western	0.17	0.17
Educational attainment		
Up till lower vocational	0.24	0.25
Vocational	0.11	0.12
Higher vocational	0.17	0.14
University degree	0.33	0.35
And partner University degree	0.41	0.42

Segregation index metropolitan Amsterdam

- Can not nicely recreate segregation index as the function is space dependent
- It is a nice function to include as a loss function

Category	Segregation index
Autochtoon	0.216429
Marokkaans	0.347506
Overig	0.203417
Surinaams	0.181780
Turks	0.317531

Category	Segregation index
1	0.263755
2	0.204790
3	0.212456

$$SI = \frac{1}{2} \sum_{i=1}^{K} \left| \frac{A_i}{A} - \frac{t_i - A_i}{T - A} \right|$$

where

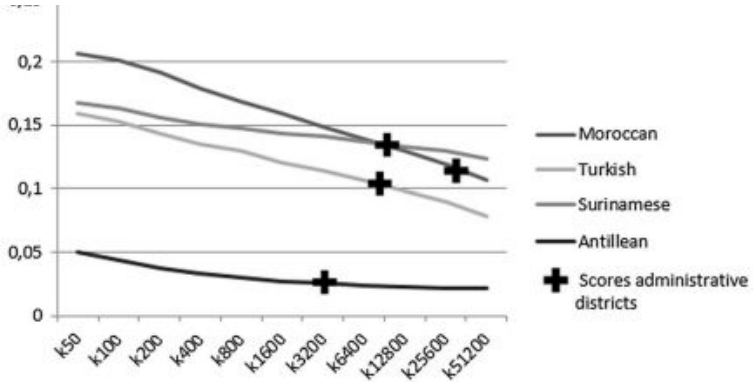
$$A = \sum_{i=1}^{K} A_i$$

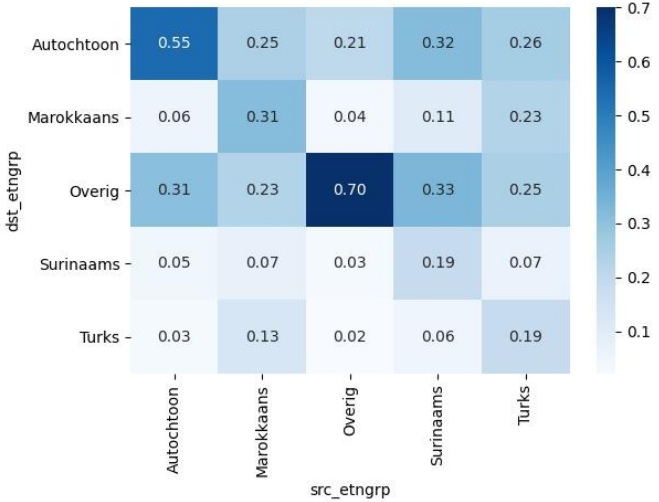
$$T = \sum_{i=1}^{K} t_i$$

Isolation index

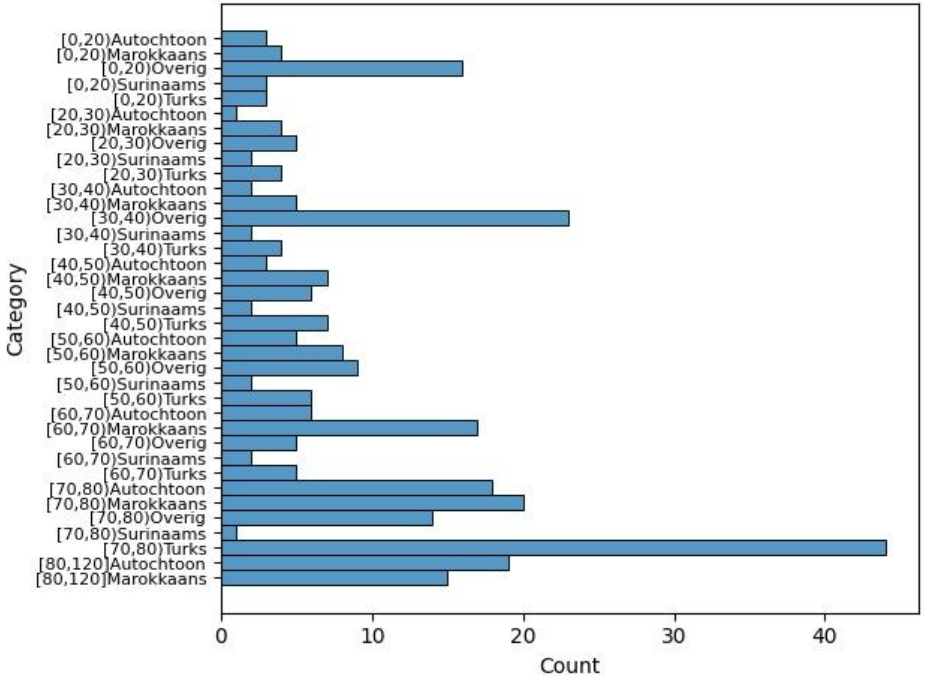
$$\text{Spatial Isolation}_k = \sum_{i=1}^{n} \frac{\left(x_i * \frac{x_{i,k}}{k}\right)}{(x_i)}$$

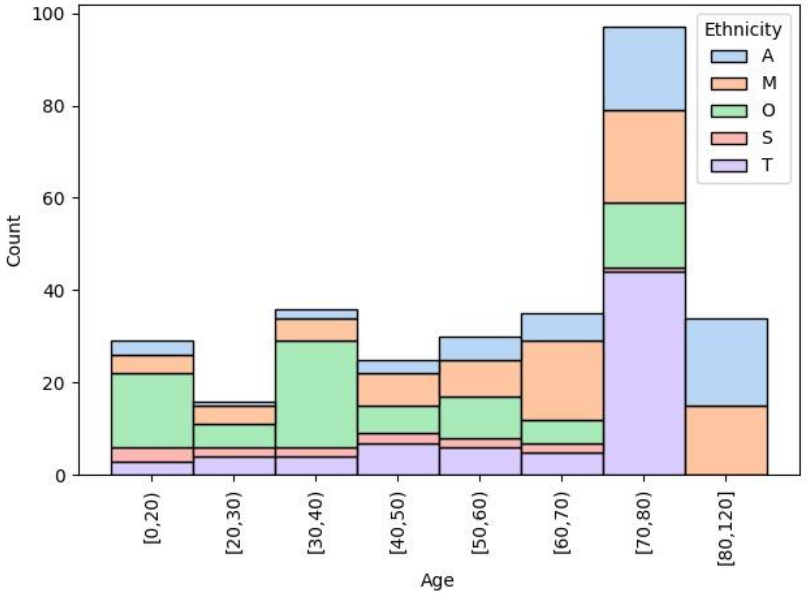
- The chance that someone of an ethnic group will encounter a coethnic during a walk through the region. Our data shows a bit higher Isolation index but that is probably due to the fact that Sleutjes et al.,(2018) used data from 2011 and from the whole metropolitan area.



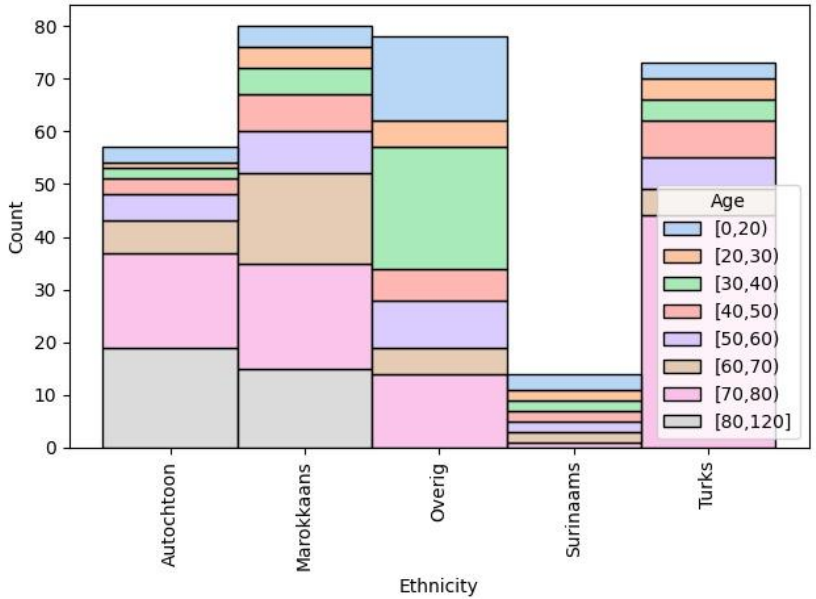


Overlap age-ethnicity





Overlap age-ethnicity



Diversity summary

Neighborhood

- Within the Neighbours table we see segregation mainly based on education level and ethnicity (like the paper of Boterman, Musterd & Manting 2021 also describe)
- Age and gender also seems to have a role in segregation, especially the age group 20,30 and the male gender

Family

- We see that there is mostly homophily within the ethnicity, education level (especially low education) and also age category. It also seems like females tend to have more male relatives than female relatives

Household

- The categories ethnicity, age and education show homophily
- Gender shows Heterophily

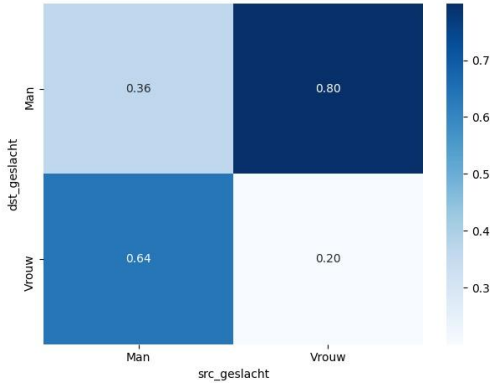
Work/School

- When looking at the normalized data (connections/n_destination group) we see there is homophily based on ethnicity (mainly turks and moroccans) and education level
- Gender is equally distributed
- People are only segregated based on age when relatively young (0,20 - 20,30)

Heatmaps and theils index

- The following slides show the normalized heatmaps (connections/size destination group) for each network layer.
- The Theil’s index is also represented in addition to the heatmaps.

Household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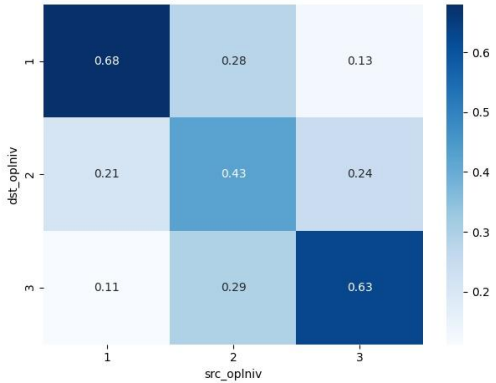
Man
Vrouw
0.36
0.80
0.64
0.20
Man
Vrouw
src_geslacht
0.7
0.6
0.5
0.4
0.3


dst_lft
[0,20)
[20,30)
[30,40)
[40,50)
[50,60)
[60,70)
[70,80)
[80,120]
0.58 0.06 0.05 0.20 0.15 0.01 0.00 0.00
0.03 0.25 0.12 0.05 0.03 0.01 0.00 0.00
0.08 0.45 0.72 0.17 0.01 0.01 0.00 0.00
0.14 0.09 0.08 0.36 0.14 0.01 0.00 0.00
0.16 0.09 0.01 0.21 0.48 0.10 0.00 0.00
0.01 0.05 0.01 0.02 0.15 0.50 0.08 0.00
0.00 0.00 0.00 0.00 0.03 0.37 0.68 0.15
0.00 0.00 0.00 0.00 0.00 0.00 0.23 0.85
[0,20) [20,30) [30,40) [40,50) [50,60) [60,70) [70,80) [80,120]
src_lft
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0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2
3
0.68 0.28 0.13
0.21 0.43 0.24
0.11 0.29 0.63
1
2
3
src_opliv
0.6
0.5
0.4
0.3
0.2


dst_etngrp
Autochtoon
Marokkaans
Overig
Surinaams
Turks
Autochtoon 0.72 0.00 0.07 0.03 0.00
Marokkaans 0.02 0.99 0.00 0.00 0.00
Overig 0.19 0.00 0.91 0.01 0.00
Surinaams 0.05 0.00 0.01 0.96 0.00
Turks 0.02 0.00 0.01 0.00 1.00
Autochtoon Marokkaans Overig Surinaams Turks
src_etngrp
0.8
0.6
0.4
0.2
0.0

Household

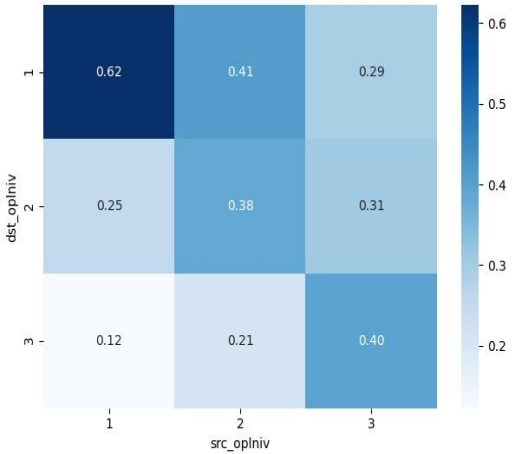
	Source	Theil
0	Man	0.054209
1	Vrouw	0.277224

	Source	Theil
0	1.0	0.240308
1	2.0	0.017238
2	3.0	0.184296

	Source	Theil
0	[0,20)	0.404566
1	[20,30)	0.281656
2	[30,40)	0.545642
3	[40,50)	0.257215
4	[50,60)	0.285130
5	[60,70)	0.469934
6	[70,80)	0.597670
7	[80,120]	0.793460

	Source	Theil
0	Autochtoon	0.477742
1	Marokkaans	0.976422
2	Overig	0.773960
3	Surinaams	0.873114
4	Turks	0.978674

Family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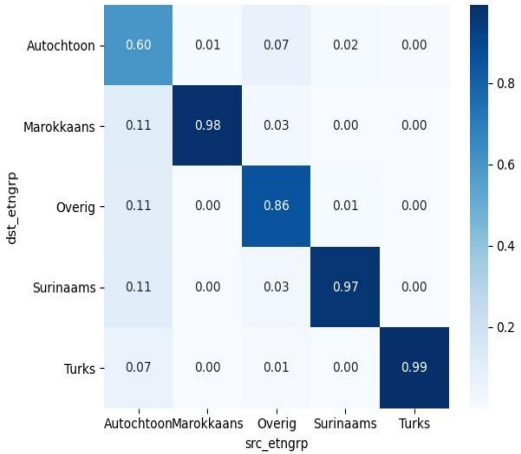
1
2
3
0.62
0.41
0.29
0.25
0.38
0.31
0.12
0.21
0.40
1
2
3
src_oplniv
0.6
0.5
0.4
0.3
0.2


dst_etngrp
Autochtoon
Marokkaans
Overig
Surinaams
Turks
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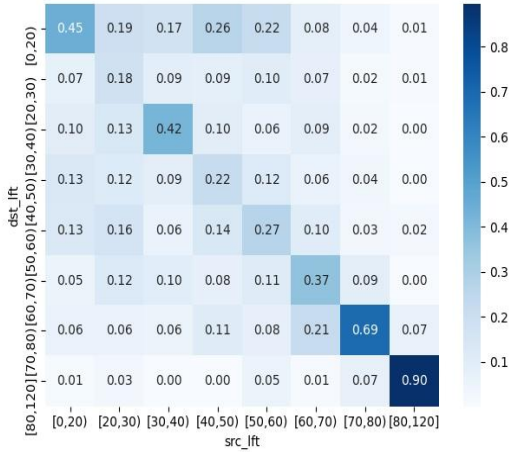
0.11 0.98 0.03 0.00 0.00
0.11 0.00 0.86 0.01 0.00
0.11 0.00 0.03 0.97 0.00
0.07 0.00 0.01 0.00 0.99
Autochtoon
Marokkaans
Overig
Surinaams
Turks
src_etngrp
0.8
0.6
0.4
0.2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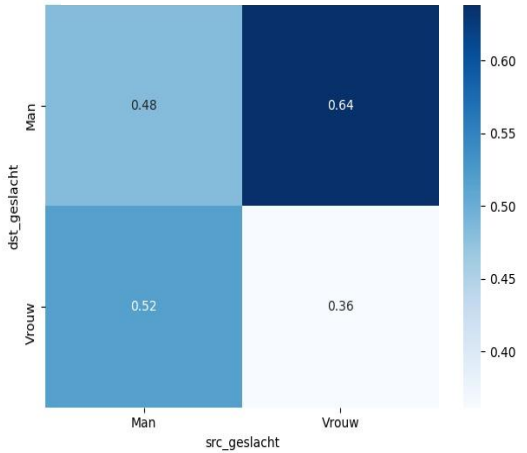
[0,20)
[20,30)
[30,40)
[40,50)
[50,60)
[60,70)
[70,80)
[80,120]
0.45 0.19 0.17 0.26 0.22 0.08 0.04 0.01
0.07 0.18 0.09 0.09 0.10 0.07 0.02 0.01
0.10 0.13 0.42 0.10 0.06 0.09 0.02 0.00
0.13 0.12 0.09 0.22 0.12 0.06 0.04 0.00
0.13 0.16 0.06 0.14 0.27 0.10 0.03 0.02
0.05 0.12 0.10 0.08 0.11 0.37 0.09 0.00
0.06 0.06 0.06 0.11 0.08 0.21 0.69 0.07
0.01 0.03 0.00 0.00 0.05 0.01 0.07 0.90
[0,20)
[20,30)
[30,40)
[40,50)
[50,60)
[60,70)
[70,80)
[80,120]
src_lft
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1


dst_geslacht
Man
Vrouw
0.48 0.64
0.52 0.36
Man
Vrouw
src_geslacht
0.60
0.55
0.50
0.45
0.40

Family

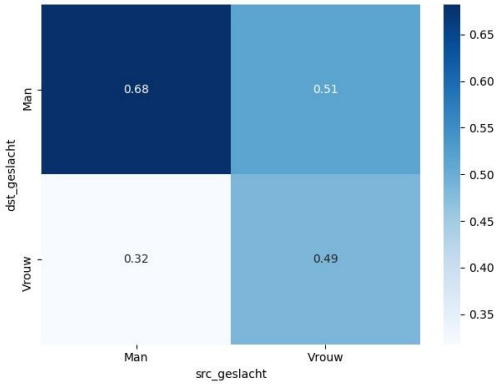
	Source	Theil
0	Man	0.000918
1	Vrouw	0.055946

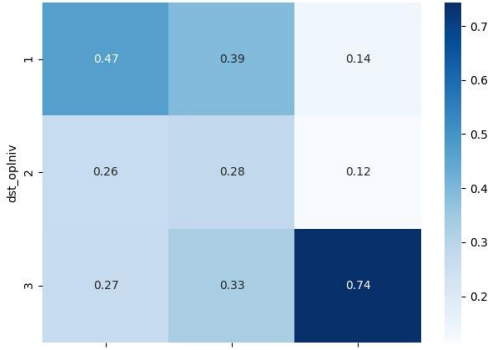
	Source	Theil
0	1.0	0.180148
1	2.0	0.035054
2	3.0	0.008122

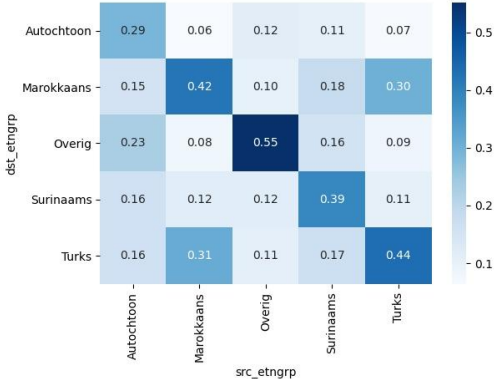
	Source	Theil
0	[0,20)	0.192190
1	[20,30)	0.051131
2	[30,40)	0.187813
3	[40,50)	0.105352
4	[50,60)	0.073018
5	[60,70)	0.158547
6	[70,80)	0.435552
7	[80,120]	0.781028

	Source	Theil
0	Autochtoon	0.244020
1	Marokkaans	0.939745
2	Overig	0.639825
3	Surinaams	0.901218
4	Turks	0.966149

Neighbourhood







Neighbours

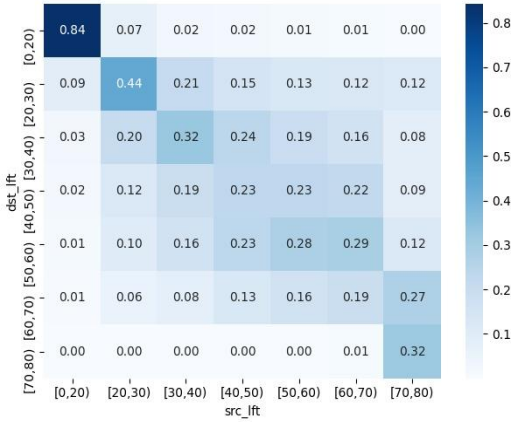
	Source	Theil
0	Man	0.102324
1	Vrouw	0.001051

	Source	Theil
0	1.0	0.030018
1	2.0	0.005145
2	3.0	0.259346

	Source	Theil
0	[0,20)	0.016494
1	[20,30)	0.400486
2	[30,40)	0.071052
3	[40,50)	0.030496
4	[50,60)	0.027878
5	[60,70)	0.028312
6	[70,80)	0.049383
7	[80,120]	0.117263

	Source	Theil
0	Autochtoon	0.020221
1	Marokkaans	0.152311
2	Overig	0.187133
3	Surinaams	0.065211
4	Turks	0.156775

Work/School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[20,30)
[30,40)
[40,50)
[50,60)
[60,70)
[70,80)
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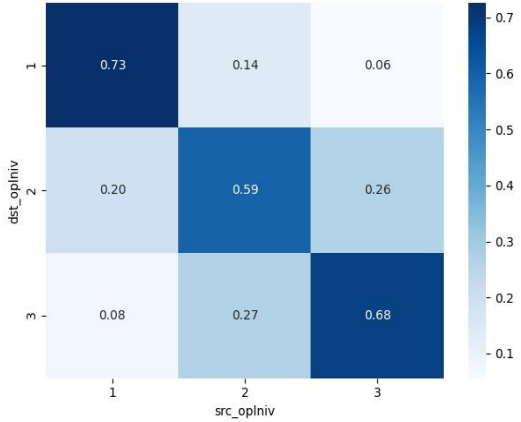
0.09 0.44 0.21 0.15 0.13 0.12 0.12
0.03 0.20 0.32 0.24 0.19 0.16 0.08
0.02 0.12 0.19 0.23 0.23 0.22 0.09
0.01 0.10 0.16 0.23 0.28 0.29 0.12
0.01 0.06 0.08 0.13 0.16 0.19 0.27
0.00 0.00 0.00 0.00 0.00 0.01 0.32
[0,20) [20,30) [30,40) [40,50) [50,60) [60,70) [70,80)
src_lft
0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1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1
2
3
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0.08 0.27 0.68
1 2 3
src_oplniv
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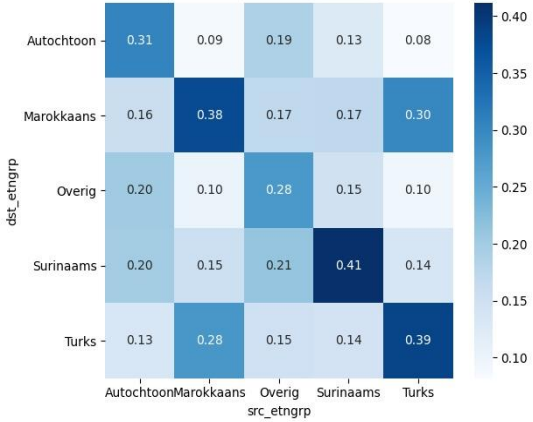
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Autochtoon
Marokkaans
Overig
Surinaams
Turks
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0.16 0.38 0.17 0.17 0.30
0.20 0.10 0.28 0.15 0.10
0.20 0.15 0.21 0.41 0.14
0.13 0.28 0.15 0.14 0.39
Autochtoon Marokkaans Overig Surinaams Turks
src_etngrp
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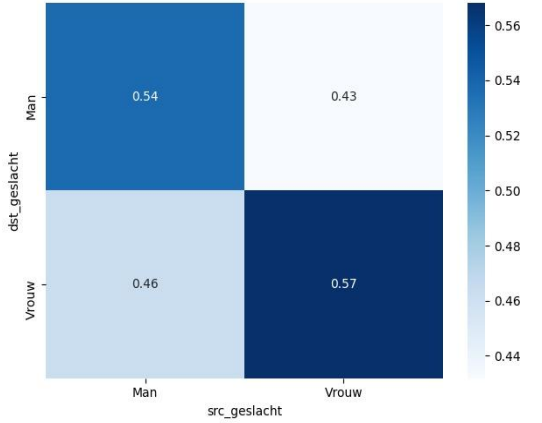
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Man
Vrouw
0.54 0.43
0.46 0.57
Man Vrouw
src_geslacht
0.56 0.54 0.52 0.50 0.48 0.46 0.44

Work/School

	Source	Theil
0	Man	0.003984
1	Vrouw	0.013420

	Source	Theil
0	1.0	0.315839
1	2.0	0.146766
2	3.0	0.293442

	Source	Theil
0	[0,20)	0.678147
1	[20,30)	0.208779
2	[30,40)	0.172467
3	[40,50)	0.152887
4	[50,60)	0.158001
5	[60,70)	0.156455
6	[70,80)	0.146938

Source	Theil
utochtoon	0.025498
arokkaans	0.095094
Overig	0.014920
urinaams	0.074414
Turks	0.112187