Global Recipe Sentiment Analysis

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May 2024

```
[1]: import pandas as pd
     import matplotlib.pyplot as plt
     import nltk
     from nltk.probability import FreqDist
     import numpy as np
     import csv
     from collections import Counter
```

1 Pre-processing steps

```
[2]: file = open("whole_data_final.txt", 'r', encoding='utf-8').read()
```

```
[3]: def prepoccessingData2(data_file):
       newspapers = data_file.
     ↪split("_____")
       newspapers = newspapers[1:-1]

       column_name = ['Full text', 'Subject', 'Title', 'Publication title',␣
     ↪'Publication year', 'Place of publication']
       newspaper_df = pd.DataFrame(columns=column_name)
       newspaper = []
       for i in range(0, len(newspapers)):

         newspapers[i] = newspapers[i].split('\n\n')
         newspaper_list = ["","","","","",""]

         for datum in newspapers[i]:
           if ':' in datum:
             datum = datum.split(': ')
             if datum[0] in column_name:
               if datum[0] == 'Full text':
                 datum[1] = datum[1].replace("\xa0 ", "")
                 punc = '''!()-[]{};:'"“”’\\,<>./?@#$%^&*_~'''
                 for character in datum[1]:
                       if character in punc:
                           datum[1] = datum[1].replace(character, "")
                 newspaper_list[0] = datum[1]
```

```
            if datum[0] == 'Subject':
                newspaper_list[1] = datum[1]
            if datum[0] == 'Title':
                newspaper_list[2] = datum[1]
            if datum[0] == 'Publication title':
                newspaper_list[3] = datum[1]
            if datum[0] == 'Publication year':
                newspaper_list[4] = datum[1]
            if datum[0] == 'Place of publication':
                newspaper_list[5] = datum[1]
        newspaper.append(newspaper_list)
    newspaper_df = pd.DataFrame(newspaper, columns=column_name)
    return newspaper_df
```

[4]:
```
df = prepoccessingData2(file)
```

1.0.1 Fixing some errors: Full Article

[5]:
```
article = []
for art in file.
 ↪split("_____"):
    article.append(art)
```

[6]:
```
article = article[1:-1]
len(article) # confirm that length of the article matches with the length of␣
 ↪newspaper_df
```

[6]: 6580

[7]:
```
recipe = []
start = "Full text:"
end1 = "Subject:"
end2 = "Title:"

for art in article:
    if end1 in art:
        sub = art[art.find(start)+11:art.find(end1)] # sometimes article ends␣
 ↪before "Subject:"
    else:
        sub = art[art.find(start)+11:art.find(end2)] # sometimes article ends␣
 ↪before "Title:"
    recipe.append(sub)
```

[8]:
```
new_df = pd.DataFrame({"Full text":recipe})
```

[9]:
```
df["Full text"] = new_df
```

1.0.2 Fixing some errors: Publication Year

```python
[10]: def count_spaces(some_string):
          return some_string.count(" ")
```

```python
[11]: space_series = df['Publication year'].apply(count_spaces)
```

```python
[12]: space_series.value_counts()
```

```
[12]: Publication year
      0      6577
      1         3
      Name: count, dtype: int64
```

```python
[13]: space_series[space_series == 1]
```

```
[13]: 638     1
      2617    1
      2827    1
      Name: Publication year, dtype: int64
```

```python
[14]: df.iloc[space_series[space_series == 1].index]['Publication year']
```

```
[14]: 638     20 18
      2617    20 07
      2827    20 05
      Name: Publication year, dtype: object
```

```python
[15]: df.loc[df['Publication year'] == "20 18", 'Publication year'] = "2018"
      df.loc[df['Publication year'] == "20 07", 'Publication year'] = "2007"
      df.loc[df['Publication year'] == "20 05", 'Publication year'] = "2005"
```

```python
[16]: space_series_2 = df['Publication year'].apply(count_spaces)
      space_series_2[space_series_2 == 1]
```

```
[16]: Series([], Name: Publication year, dtype: int64)
```

```python
[17]: df["Publication year"] = pd.to_numeric(df["Publication year"])
      df = df.sort_values(by=['Publication year']).reset_index(drop=True)
      df = df.replace("", np.nan)
      df.dropna(inplace=True, subset=["Full text","Publication year"])
```

1.0.3 Preprocessing: deleting some letters that are not related to the recipes

```python
[18]: regular_punct = ["\n","Enlarge this image","","This article originally appeared␣
      ↪in The New York Times..."]

      def remove_unnecessary(text,punct_list):
```

```
        for punc in punct_list:
            if punc in text:
                text = text.replace(punc, ' ')
        return text.strip()


df['Full text']= df['Full text'].apply(lambda x:
 ↪remove_unnecessary(x,regular_punct))
```

2 Our dictionary of country names and their demonyms:

```
[19]: # open file in read mode
      country_dict = {}
      convert_country ={}
      with open("countries.csv", 'r') as f:
          for line in csv.reader(f):
                  country_dict[line[0]] = line[1:]
                  convert_country[line[0]] = line[1]
```

```
[20]: continents = {}
      with open("continents.csv", 'r') as c:
          for line in csv.reader(c):
                  continents[line[0]] = line[1]
```

```
[21]: empty = ''
      for value in country_dict.values():
          if empty in value:
              value.remove(empty)
```

```
[22]: df.insert(1,"Country","")
      df.insert(2,"Continent","")

      # Get country names mentioned in each article
      for index, row in df.iterrows():
          for word in row["Full text"].split():
              for key, value in country_dict.items():
                  if word in value:
                      df.loc[index, 'Country'] += key + " "
```

```
[23]: # Get the most frequently mentioned country
      for index, row in df.iterrows():
          lst = Counter(row["Country"].split()).most_common(1)
          name = ""
          if lst:
              most, number = lst[0]
              name = convert_country[most]
          df.loc[index, "Country"] = name
```

```
[24]:  # Get the continent name for most frequently mentioned country
       for index, row in df.iterrows():
           name = row["Country"]
           continent = continents[name] if name else ""
           df.at[index, "Continent"] = continent
```

2.1 Divide into 4 eras

```
[25]:  era1 = df.loc[(df["Publication year"]>= 1980) & (df["Publication year"] < 1990)]
       era2 = df.loc[(df["Publication year"]>= 1990) & (df["Publication year"] < 2000)]
       era3 = df.loc[(df["Publication year"]>= 2000) & (df["Publication year"] < 2010)]
       era4 = df[df["Publication year"]>=2010]
```

```
[26]:  # era1.to_csv("era1.csv")
       # era2.to_csv("era2.csv")
       # era3.to_csv("era3.csv")
       # era4.to_csv("era4.csv")
```

3 Era 1: 1980 - 1989

```
[27]:  df_1 = pd.read_csv('./era1.csv')
       df_1 = df_1.drop("Unnamed: 0",axis=1)
       df_1 = df_1.replace(np.nan,"")
```

```
[28]:  df_1
```

```
[28]:                                        Full text Country Continent  \
       0     Perhaps we find portents in curious places but...
       1     OFTEN, in the 23 years since I first joined Th...  Greece     Europe
       2     Q. I recently created a key lime pie from one ...  Spain      Europe
       3     For SportsMonday By NELSON BRYANT ASHORT while...  Canada   Americas
       4     NOT long ago I had planned to serve four fairl...
       ...                                                 ...     ...        ...
       1560  LEAD: PLAYING culinary ''Beat the Clock'' has ...
       1561  LEAD: THE local strawberry season has started...  Italy      Europe
       1562  LEAD: DON'T think that because tomorrow is New...  France     Europe
       1563  LEAD: ONE of the treasures of the kitchen is a...  France     Europe
       1564  LEAD: DON'T think that because tomorrow is New...  France     Europe

                                 Subject  \
       0
       1
       2
       3
       4
       ...                           ...
       1560        COOKING AND COOKBOOKS; RECIPES
```

5

```
1561     STRAWBERRIES; COOKING AND COOKBOOKS
1562                  FOOD; RECIPES; CHRISTMAS
1563         COOKING AND COOKBOOKS; RECIPES
1564                  FOOD; CHRISTMAS; RECIPES


                                                       Title  \
0                              FOOD THE FISH OF POETS
1       EVOLUTION OF A RECIPE:VARIATIONS ON A VENERABL...
2                                 QUESTIONS AND ANSWERS
3            OUTDOORS:BAYBERRIES ARE ALWAYS A GOOD PICK
4                                      60-MINUTE GOURMET
...                                                    ...
1560    FOOD; A Meal That Takes Imagination, Not All Day
1561    FOOD; Strawberries Are Here and It's Time for ...
1562                  FOOD; Christmas Just Keeps On Going
1563           FOOD; Whipping Up Canapes on Short Notice
1564                  FOOD; Christmas Just Keeps On Going


                                      Publication title  Publication year  \
0       New York Times, Late Edition (East Coast); New...              1980.0
1       New York Times, Late Edition (East Coast); New...              1980.0
2       New York Times, Late Edition (East Coast); New...              1980.0
3       New York Times, Late Edition (East Coast); New...              1980.0
4       New York Times, Late Edition (East Coast); New...              1980.0
...                                                    ...                 ...
1560    New York Times, Late Edition (East Coast); New...              1989.0
1561    New York Times, Late Edition (East Coast); New...              1989.0
1562    New York Times, Late Edition (East Coast); New...              1989.0
1563    New York Times, Late Edition (East Coast); New...              1989.0
1564    New York Times, Late Edition (East Coast); New...              1989.0


       Place of publication
0            New York, N.Y.
1            New York, N.Y.
2            New York, N.Y.
3            New York, N.Y.
4            New York, N.Y.
...                     ...
1560         New York, N.Y.
1561         New York, N.Y.
1562         New York, N.Y.
1563         New York, N.Y.
1564         New York, N.Y.

[1565 rows x 8 columns]
```

```
[29]: full_country_1 = []
      full_continent_1 = []
      for idx, row in df_1.iterrows():
          name = row["Country"]
          cont = row["Continent"]
          if name != 'United States of America' and name != "":
              full_country_1.append(name)
          if cont != "":
              full_continent_1.append(cont)
```

3.0.1 Amount of times a country is mentioned (excluding US)

```
[30]: len(full_country_1)
```

```
[30]: 1089
```

```
[31]: country_mention_1 = len(full_country_1)/len(list(df_1["Full text"])) * 100
      country_mention_1
```

```
[31]: 69.58466453674122
```

3.0.2 20 most common countries mentioned

```
[32]: entity_string_freq_1 = nltk.FreqDist(full_country_1)
      print(entity_string_freq_1.most_common(20))
      FreqDist(entity_string_freq_1).plot(20)
```

```
[('France', 325), ('Italy', 228), ('China', 128), ('Mexico', 58), ('Spain', 40),
('Greece', 31), ('Japan', 28), ('India', 25), ('Morocco', 22), ('United
Kingdom', 17), ('Netherlands', 14), ('Canada', 13), ('Switzerland', 13),
('Egypt', 12), ('Austria', 12), ('Brazil', 9), ('Jersey', 8), ('Thailand', 7),
('Germany', 7), ('Belgium', 7)]
```

```
[32]: <Axes: xlabel='Samples', ylabel='Counts'>
```
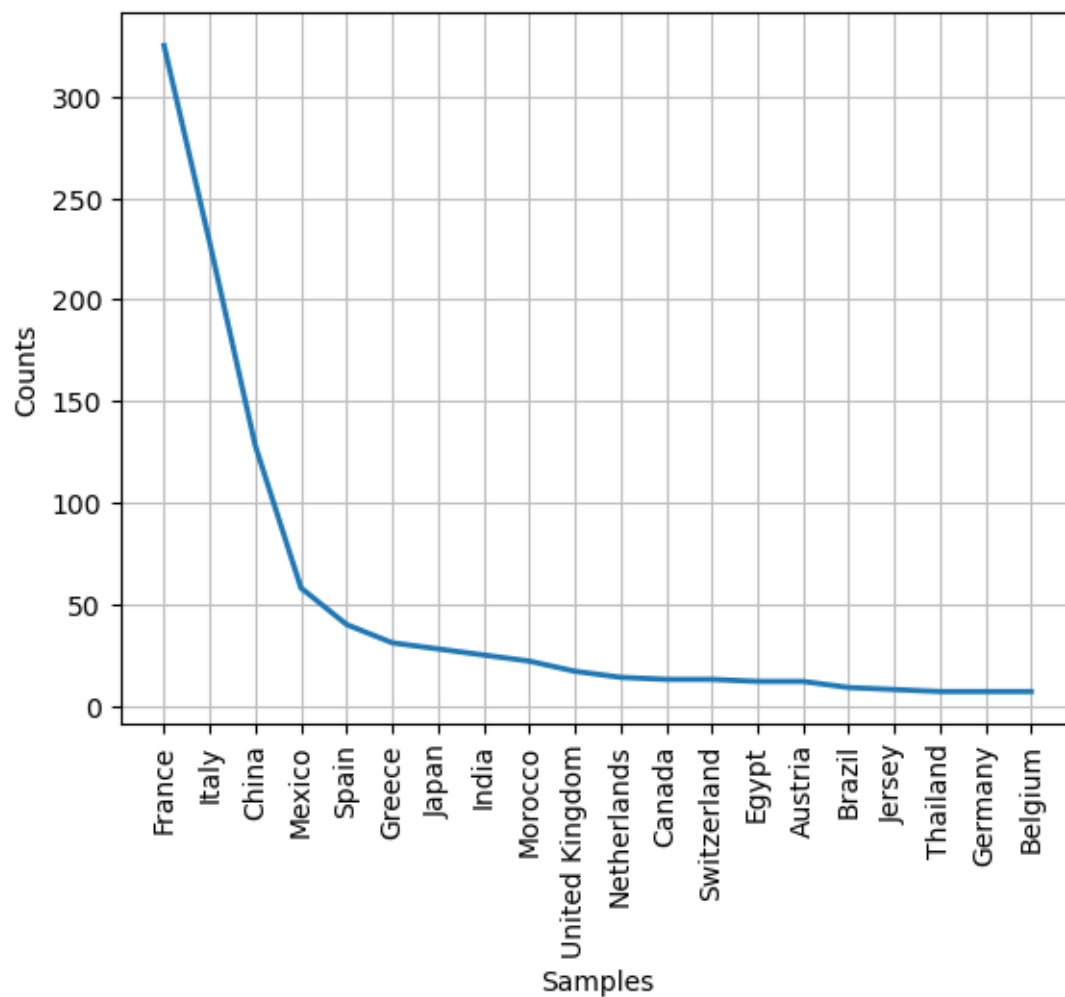
3.0.3 Plot the frequency continents

```
[33]: con_string_freq_1 = nltk.FreqDist(full_continent_1)
      print(con_string_freq_1.most_common())
      FreqDist(con_string_freq_1).plot()
```

[('Europe', 744), ('Americas', 247), ('Asia', 220), ('Africa', 34)]

[33]: <Axes: xlabel='Samples', ylabel='Counts'>
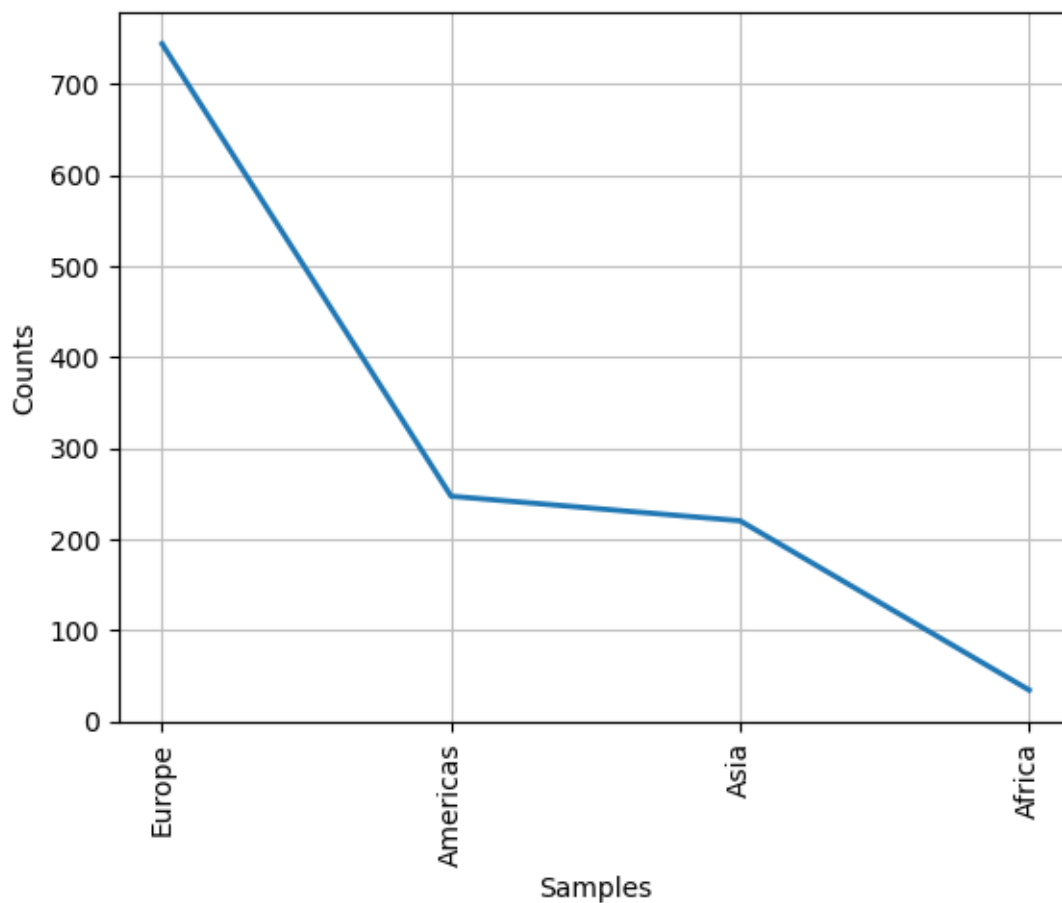
3.1 Era 2: 1990 - 1999

```
[34]: df_2 = pd.read_csv('./era2.csv')
      df_2 = df_2.drop("Unnamed: 0",axis=1)
      df_2 = df_2.replace(np.nan,"")
```

```
[35]: df_2
```

```
[35]:                                            Full text  \
      0        LEAD: VIRGIL THOMSON used to say that when you...
      1        LEAD: THE late Alfredo Viazzi had for years a ...
      2        LEAD: THE late Alfredo Viazzi had for years a ...
      3        LEAD: PVT. Danyn Dubois is in training at this...
      4        LEAD: MOST home cooks shy away from curry for ...
      ...                                                     ...
      1723     SCALLOPS have so many virtues -- they're tende...
      1724     Headnote Remembrance of foods past. DEAR DESCE...
      1725     IT'S a simple almond cake, leavened by egg whi...
```

```
1726  CHESTNUTS are challenging. Unlike walnuts, pec...
1727  SOMETIMES recipes say more about a place and t...


                            Country Continent  \
0                            France    Europe
1                             Italy    Europe
2                             Italy    Europe
3      United States of America  Americas
4
...                             ...       ...
1723
1724  United States of America  Americas
1725                        France    Europe
1726
1727                       Georgia      Asia


                                                 Subject  \
0                     COOKING AND COOKBOOKS; RECIPES
1                     COOKING AND COOKBOOKS; RECIPES
2                     COOKING AND COOKBOOKS; RECIPES
3      COOKING AND COOKBOOKS; UNITED STATES ARMAMENT ...
4                     COOKING AND COOKBOOKS; RECIPES
...                                                  ...
1723
1724          Food; Time capsules; Recipes; Millennium
1725                     Recipes; Cooking; Desserts
1726
1727


                                                   Title  \
0      FOOD; Having Company? You Can Still Serve a Roast
1              FOOD; Autumn Game With a Touch of Tuscany
2              FOOD; Autumn Game With a Touch of Tuscany
3                     Learning to Feed A Battalion or Two
4                                     60-MINUTE GOURMET
...                                                  ...
1723                            Scallops, Plus Crunch
1724                                  Good and plenty
1725            The Pastry Chef's Rich Little Secret
1726                The Chestnut Comes Out of Its Shell
1727  Recipes of the South That Speak for the People...


                                   Publication title  Publication year  \
0      New York Times, Late Edition (East Coast); New...              1990.0
1      New York Times, Late Edition (East Coast); New...              1990.0
2      New York Times, Late Edition (East Coast); New...              1990.0
3      New York Times, Late Edition (East Coast); New...              1990.0
```

```
4       New York Times, Late Edition (East Coast); New...           1990.0
...                                                         ...              ...
1723  New York Times, Late Edition (East Coast); New...           1999.0
1724                    New York Times Magazine; New York           1999.0
1725  New York Times, Late Edition (East Coast); New...           1999.0
1726  New York Times, Late Edition (East Coast); New...           1999.0
1727  New York Times, Late Edition (East Coast); New...           1999.0

      Place of publication
0              New York, N.Y.
1              New York, N.Y.
2              New York, N.Y.
3              New York, N.Y.
4              New York, N.Y.
...                       ...
1723           New York, N.Y.
1724                 New York
1725           New York, N.Y.
1726           New York, N.Y.
1727           New York, N.Y.

[1728 rows x 8 columns]
```

```python
[36]: full_country_2 = []
      full_continent_2 = []
      for idx, row in df_2.iterrows():
          name = row["Country"]
          cont = row["Continent"]
          if name != 'United States of America' and name != '':
              full_country_2.append(name)
          if cont != "":
              full_continent_2.append(cont)
```

3.1.1 Amount of times a country is mentioned (excluding US)

```python
[37]: len(full_country_2)
```

```
[37]: 1185
```

```python
[38]: country_mention_2 = len(full_country_2)/len(list(df_2["Full text"])) * 100
      country_mention_2
```

```
[38]: 68.57638888888889
```

3.1.2 20 most common countries mentioned

```
entity_string_freq_2 = nltk.FreqDist(full_country_2)
print(entity_string_freq_2.most_common(20))
FreqDist(entity_string_freq_2).plot(20)
```

[('Italy', 318), ('France', 273), ('China', 103), ('India', 70), ('Mexico', 54), ('Spain', 41), ('Switzerland', 27), ('Turkey', 26), ('United Kingdom', 24), ('Netherlands', 24), ('Japan', 23), ('Greece', 23), ('Thailand', 20), ('Russian Federation', 17), ('Hungary', 16), ('Vietnam', 12), ('Belgium', 10), ('Canada', 10), ('Ireland', 9), ('Germany', 8)]

[39]: <Axes: xlabel='Samples', ylabel='Counts'>
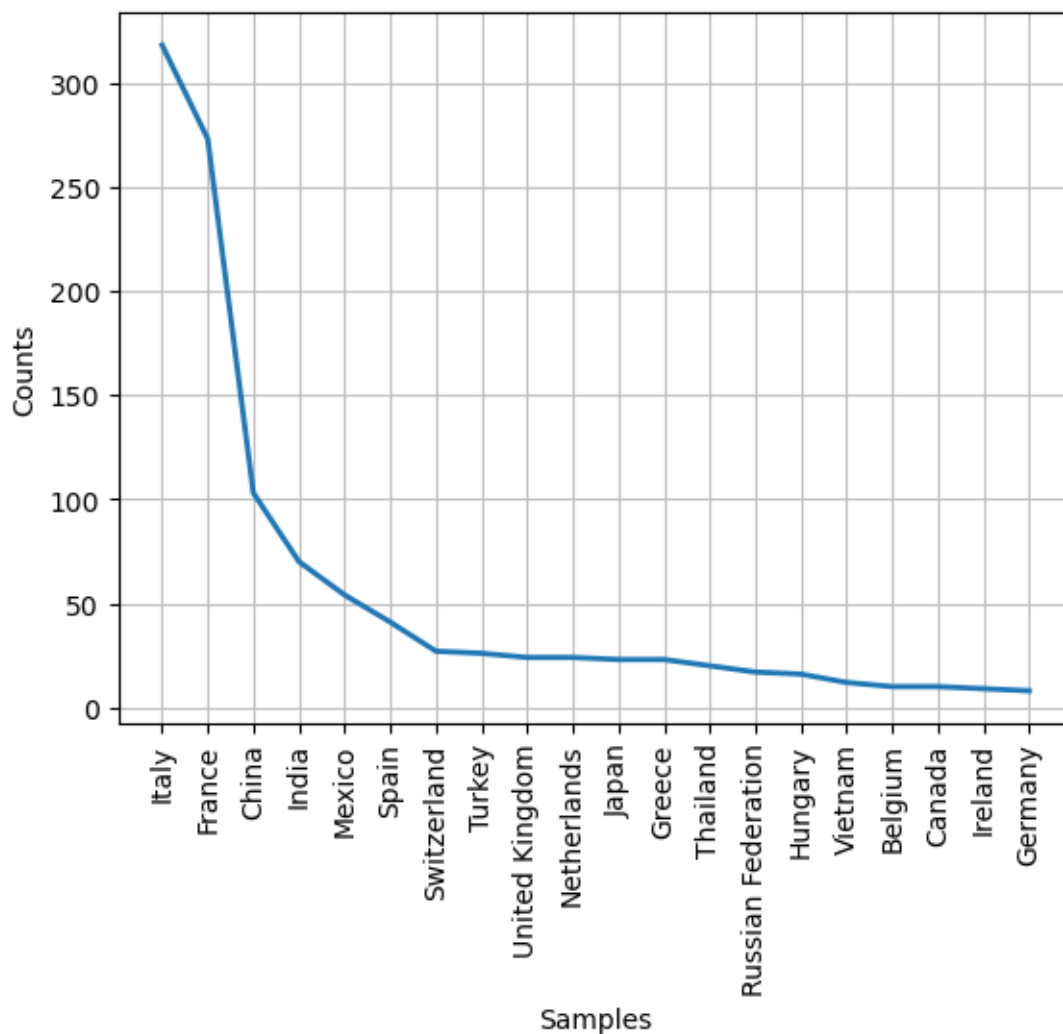
3.1.3 Plot the frequency by continents

```
[40]: con_string_freq_2 = nltk.FreqDist(full_continent_2)
      print(con_string_freq_2.most_common())
      FreqDist(con_string_freq_2).plot()
```

['Europe', 809), ('Asia', 276), ('Americas', 220), ('Africa', 8), ('Oceania', 2)]

[40]: <Axes: xlabel='Samples', ylabel='Counts'>
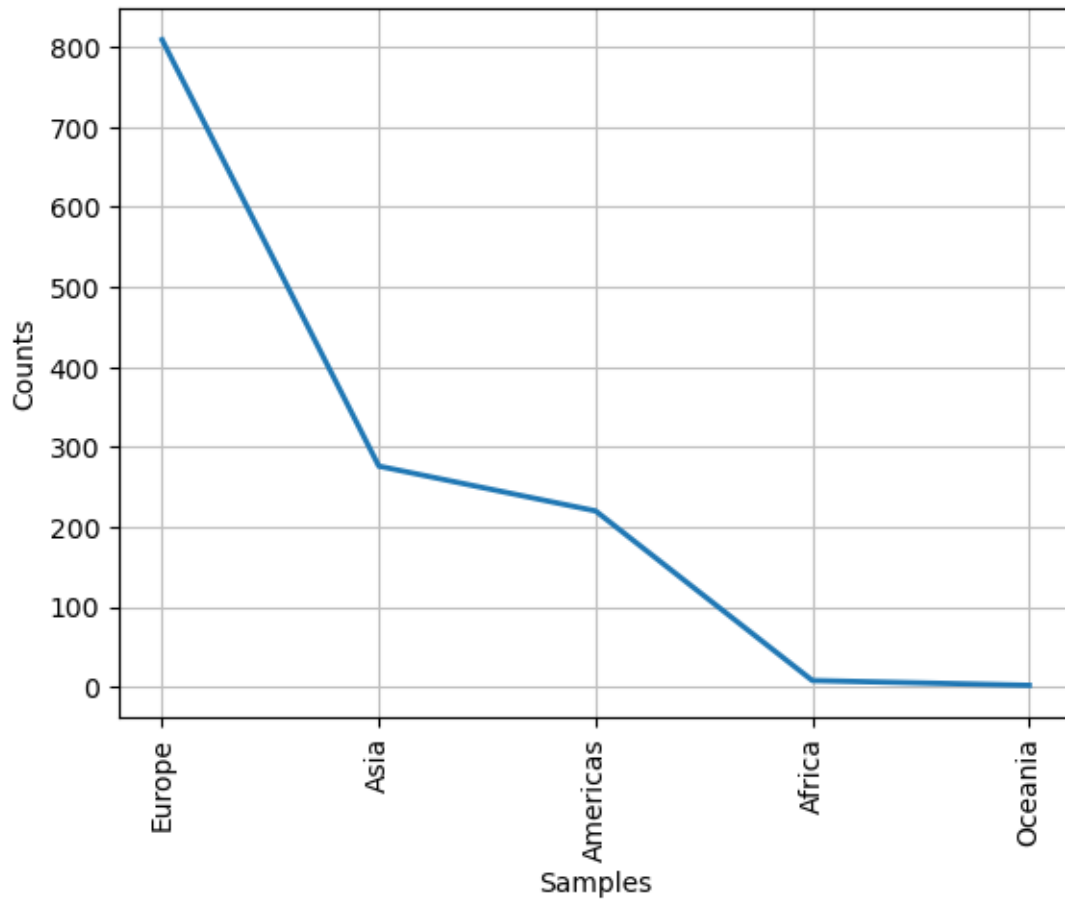
3.2 Era 3: 2000 - 2009

```
[41]: df_3 = pd.read_csv('./era3.csv')
      df_3 = df_3.drop("Unnamed: 0",axis=1)
      df_3 = df_3.replace(np.nan,"")
```

```
[42]: df_3
```

```
[42]:                                               Full text  \
      0    Headnote A well-prepared meal might be the way...
      1    THERE are two ways to give a dinner party and ...
      2    Headnote A rare instance in which fat is your ...
      3    Headnote How I Learned to Stop Worrying... Hea...
      4    Headnote Who wants to he a millionaire? [veryo...
      ..                                                 ...
      993  Want to make some extra dough on weekends? Piz...
      994  PAUL LIEBRANDT wants the world to know that he...
      995  MICHAEL RUHLMAN says his new book, "Ratio: The...
      996  WHEN you've gained enough experience cooking, ...
      997  AS if a menu with lamb's tongue, calf's heart,...

                           Country Continent  \
      0                      Spain    Europe
      1                      Italy    Europe
      2                Netherlands    Europe
      3                     Brazil  Americas
      4    United States of America  Americas
      ..                       ...       ...
      993                  Albania    Europe
      994           United Kingdom    Europe
      995                   France    Europe
      996                    Italy    Europe
      997           United Kingdom    Europe

                                             Subject  \
      0                          Cooking; Recipes; Food
      1
      2                           Recipes; Meat; Cooking
      3           Social life & customs; Cooking; Recipes
      4             Personal profiles; Cooking; Contests
      ..                                           ...
      993                       Pizza; Cooking; Recipes
      994                                   Restaurants
      995  Cooking; Recipes; Cookbooks; Books -- Ratio
      996          Vegetables; Recipes; Cooking; Soups
      997             Restaurants -- Feast-Houston TX

                                               Title  \
      0                            A taste for seduction
      1    Give the Guests a Chef's Apron and Let the Coo...
      2                                    Lvoe me tender
      3    How I learned to stop worrying...and entertain...
      4                                Put up your mitts
      ..                                             ...
      993                                     Crust Fund
```

```
994                                      At Home, at Last
995                 Everyday Cooking Is as Easy as 3:2:1
996                  A Soup Only a Tuscan Could Think Up
997           British Derring-Do, Innards a Specialty


                                   Publication title  Publication year  \
0                 New York Times Magazine; New York                2000.0
1     New York Times, Late Edition (East Coast); New...              2000.0
2                 New York Times Magazine; New York                2000.0
3                 New York Times Magazine; New York                2000.0
4                 New York Times Magazine; New York                2000.0
..                                              ...                 ...
993               New York Times Magazine; New York                2009.0
994   New York Times, Late Edition (East Coast); New...              2009.0
995   New York Times, Late Edition (East Coast); New...              2009.0
996   New York Times, Late Edition (East Coast); New...              2009.0
997   New York Times, Late Edition (East Coast); New...              2009.0


      Place of publication
0              New York
1         New York, N.Y.
2              New York
3              New York
4              New York
..                  ...
993            New York
994       New York, N.Y.
995       New York, N.Y.
996       New York, N.Y.
997       New York, N.Y.

[998 rows x 8 columns]
```

[43]:
```python
full_country_3 = []
full_continent_3 = []
for idx, row in df_3.iterrows():
    name = row["Country"]
    cont = row["Continent"]
    if name != 'United States of America' and name != '':
        full_country_3.append(name)
    if cont != "":
        full_continent_3.append(cont)
```

3.2.1 Amount of times a country is mentioned (excluding US)

```
[44]: len(full_country_3)
```

```
[44]: 697
```

```
[45]: country_mention_3 = len(full_country_3)/len(list(df_3["Full text"])) * 100
      country_mention_3
```

```
[45]: 69.83967935871743
```

3.2.2 20 most common countries mentioned

```
[46]: entity_string_freq_3 = nltk.FreqDist(full_country_3)
      print(entity_string_freq_3.most_common(20))
      FreqDist(entity_string_freq_3).plot(20)
```

```
[('France', 142), ('Italy', 112), ('Spain', 47), ('China', 42), ('Thailand',
31), ('Japan', 30), ('Mexico', 29), ('Netherlands', 24), ('Greece', 24),
('India', 21), ('United Kingdom', 18), ('Switzerland', 16), ('Vietnam', 13),
('Turkey', 11), ('Germany', 10), ('Israel', 10), ('Morocco', 10), ('Brazil', 6),
('Cuba', 6), ('Jamaica', 6)]
```

```
[46]: <Axes: xlabel='Samples', ylabel='Counts'>
```
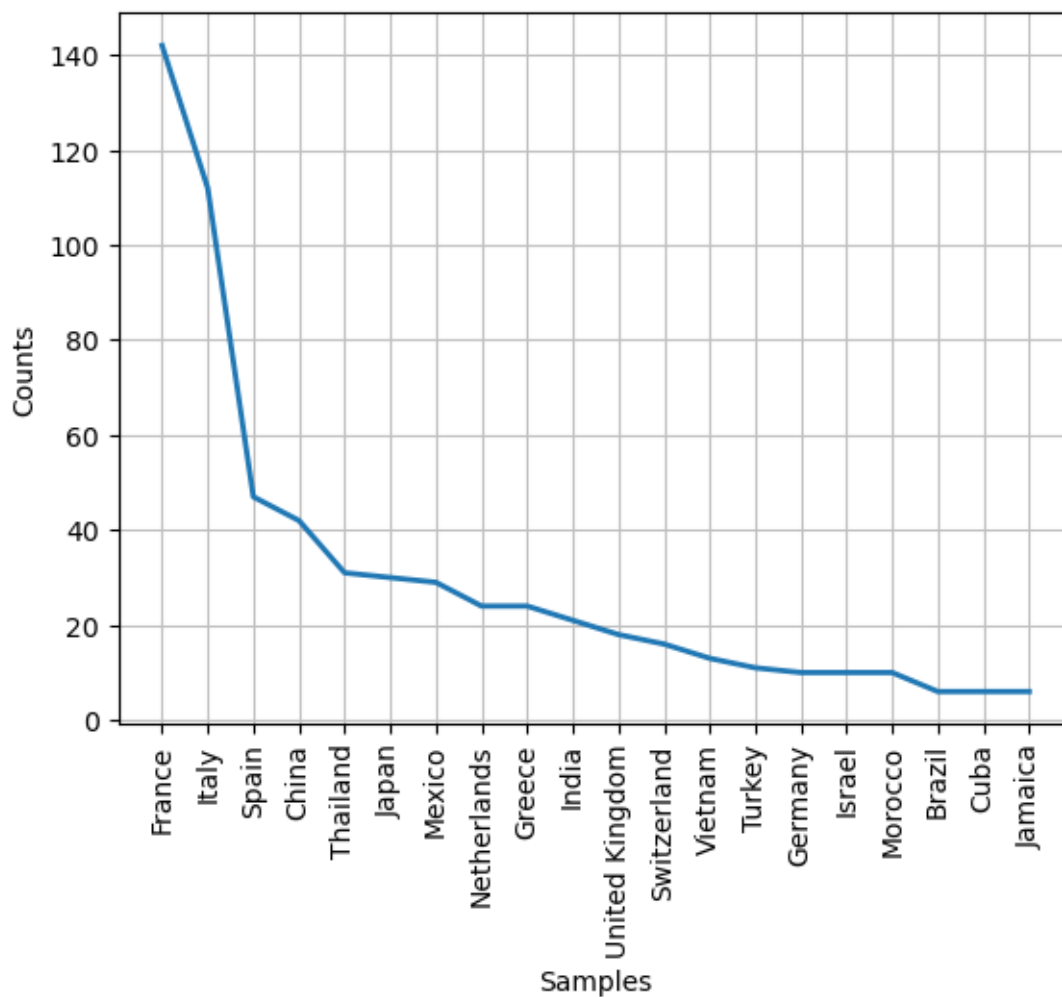
3.2.3 Plot the frequency by continents

```
[47]: con_string_freq_3 = nltk.FreqDist(full_continent_3)
      print(con_string_freq_3.most_common())
      FreqDist(con_string_freq_3).plot()
```

[('Europe', 431), ('Asia', 183), ('Americas', 162), ('Africa', 17), ('Oceania', 2)]

[47]: <Axes: xlabel='Samples', ylabel='Counts'>
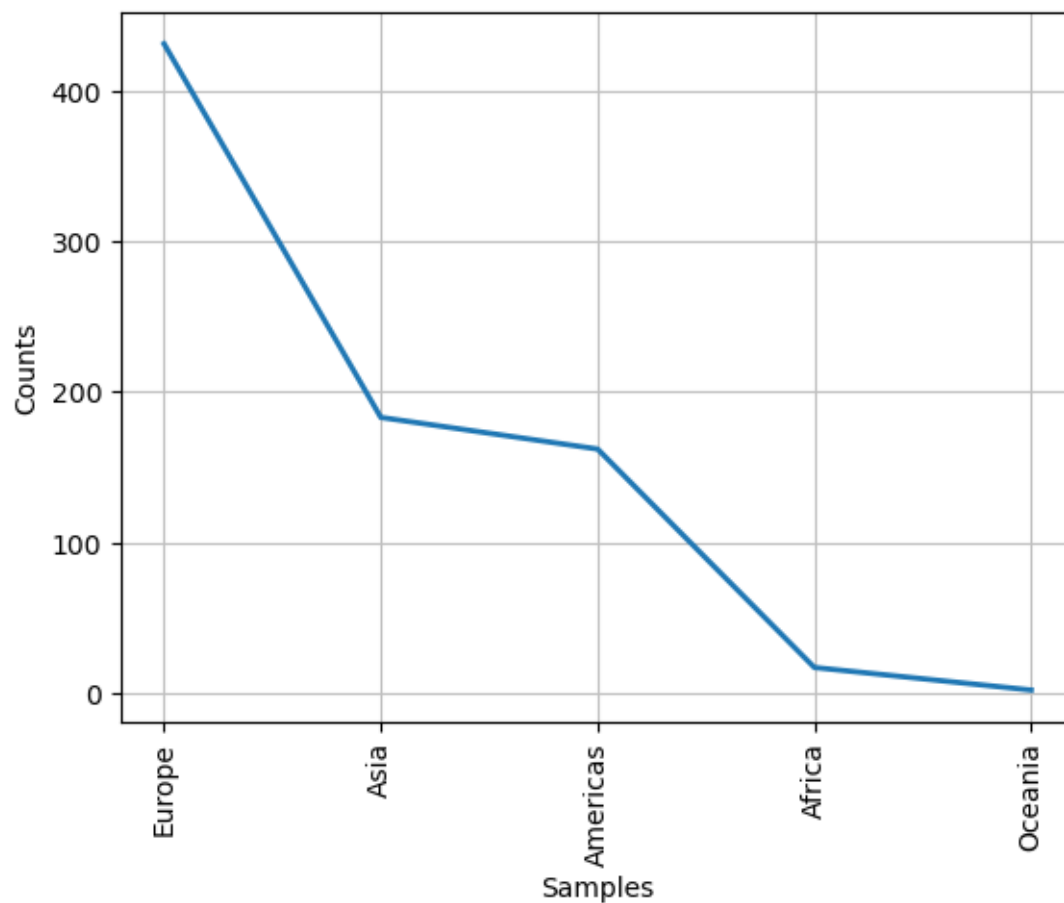
3.3 Era 4: 2010 - 2022

```
[48]: df_4 = pd.read_csv('./era4.csv')
      df_4 = df_4.drop("Unnamed: 0",axis=1)
      df_4 = df_4.replace(np.nan,"")
```

```
[49]: df_4
```

```
[49]:                                          Full text  \
      0        I'VE made several concessions at my table in t...
      1        Most trends arise not from inspiration but fro...
      2        Headnote What makes for a favorite dish? Just ...
      3        WHEN Julia Child introduced it to Americans ba...
      4        Headnote Mastering Maialino's braise-worthy sa...
      ...                                                     ...
      2264     This easy, make-ahead casserole makes creative...
      2265     When I was in graduate school, nearly a decade...
      2266     A coconut-milk dressing infused with garlic, g...
```

```
2267  Buttery and soft, tart and sweet, these muffin...
2268  Headnote Star Side: Creaminess, acidity and wa...

                       Country Continent   \
0                         Italy    Europe
1                        France    Europe
2      United States of America  Americas
3                        Greece    Europe
4                   Netherlands    Europe
...                         ...       ...
2264                      Italy    Europe
2265             United Kingdom    Europe
2266
2267
2268   United States of America  Americas


                                           Subject   \
0        Grain; Cooking; Restaurants; Recipes; Pasta
1                    Recipes; Corn; Cooking; Taste
2       Newspapers; Cooking; Recipes; Food; E mail
3                    Recipes; Cooking; Vegetables
4            Restaurants; Cooking; Recipes; Pork
...                                            ...
2264                             Eggs; Recipes
2265                   Baked goods; Recipes; Tea
2266                           Recipes; Tomatoes
2267                           Recipes; Desserts
2268                    Cooking; Spices; Recipes


                                             Title   \
0                            Cardboard No More
1                                RECIPE REDUX
2                                RECIPE REDUX
3       One Culture's Ratatouille Is Another's Fill-in...
4                                    THE CHEAT
...                                            ...
2264   Here to Help; A Recipe For English Muffin Brea...
2265                            To Steep and Slice
2266   Here to Help; A Recipe for Coconut Fish and To...
2267      Here to Help; A Recipe for Lemon Poppy Muffins
2268                                    Star Side


                                   Publication title  Publication year   \
0      New York Times, Late Edition (East Coast); New...             2010.0
1                     New York Times Magazine; New York             2010.0
2                     New York Times Magazine; New York             2010.0
3      New York Times, Late Edition (East Coast); New...             2010.0
```

```
4                    New York Times Magazine; New York         2010.0
...                                              ...              ...
2264  New York Times, Late Edition (East Coast); New...      2022.0
2265                 New York Times Magazine; New York         2022.0
2266  New York Times, Late Edition (East Coast); New...      2022.0
2267  New York Times, Late Edition (East Coast); New...      2022.0
2268                 New York Times Magazine; New York         2022.0

      Place of publication
0            New York, N.Y.
1                  New York
2                  New York
3            New York, N.Y.
4                  New York
...                     ...
2264         New York, N.Y.
2265               New York
2266         New York, N.Y.
2267         New York, N.Y.
2268               New York

[2269 rows x 8 columns]
```

```
[50]: full_country_4 = []
      full_continent_4 = []
      for idx, row in df_4.iterrows():
          name = row["Country"]
          cont = row["Continent"]
          if name != 'United States of America' and name != '':
              full_country_4.append(name)
          if cont != "":
              full_continent_4.append(cont)
```

3.3.1 Amount of times a country is mentioned (excluding US)

```
[51]: len(full_country_4)
```

```
[51]: 1541
```

```
[52]: country_mention_4 = len(full_country_4)/len(list(df_4["Full text"])) * 100
      country_mention_4
```

```
[52]: 67.91538122520934
```

3.3.2   20 most common countries mentioned

```
[53]: entity_string_freq_4 = nltk.FreqDist(full_country_4)
      print(entity_string_freq_4.most_common(20))
      FreqDist(entity_string_freq_4).plot(20)
```

[('Italy', 235), ('France', 233), ('Netherlands', 101), ('Mexico', 90), ('China', 81), ('Greece', 79), ('India', 74), ('Japan', 70), ('Spain', 62), ('Thailand', 58), ('Turkey', 35), ('Morocco', 32), ('Germany', 30), ('Switzerland', 27), ('United Kingdom', 24), ('Vietnam', 24), ('Chile', 21), ('Georgia', 17), ('Israel', 15), ('Iran', 14)]

[53]: <Axes: xlabel='Samples', ylabel='Counts'>
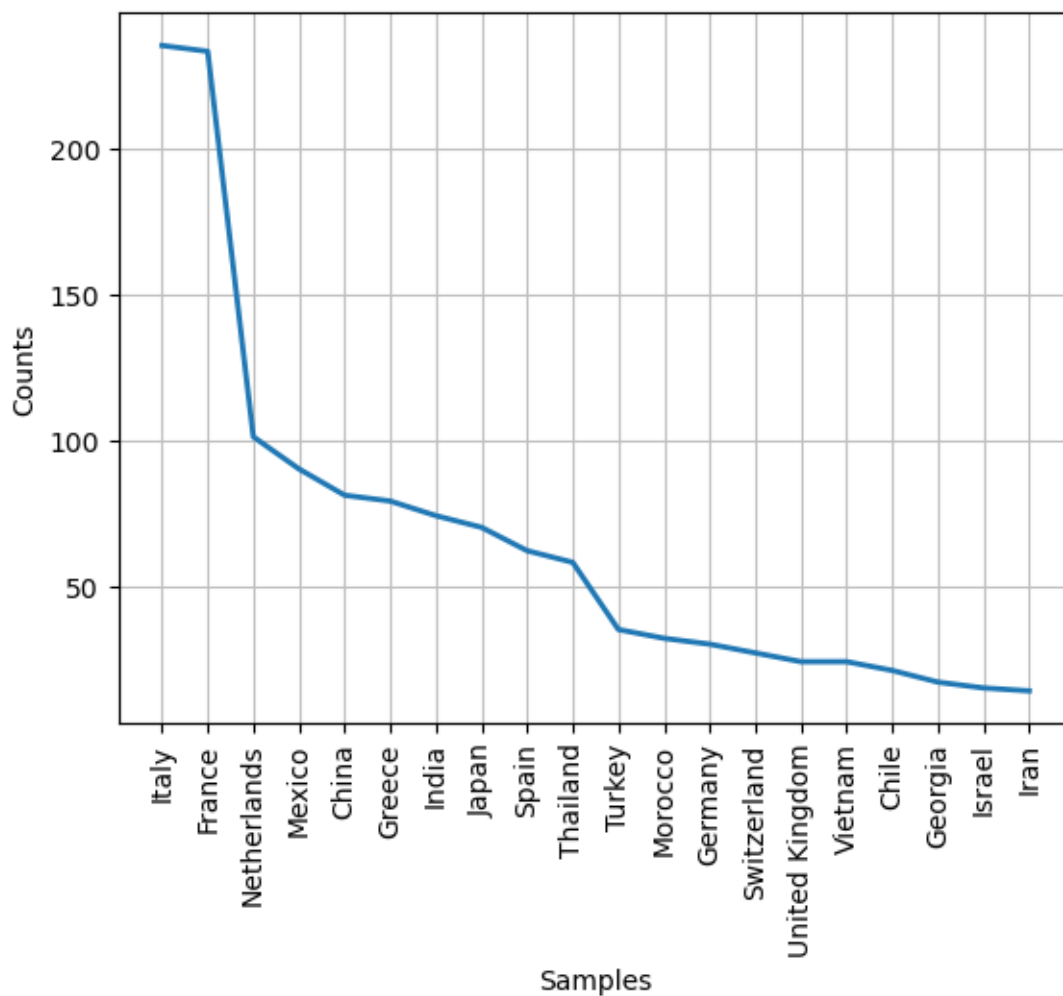
3.3.3 Plot the frequency by continents

```
[54]: con_string_freq_4 = nltk.FreqDist(full_continent_4)
      print(con_string_freq_4.most_common())
      FreqDist(con_string_freq_4).plot()
```

[('Europe', 872), ('Asia', 440), ('Americas', 322), ('Africa', 58), ('Oceania', 9)]

[54]: <Axes: xlabel='Samples', ylabel='Counts'>
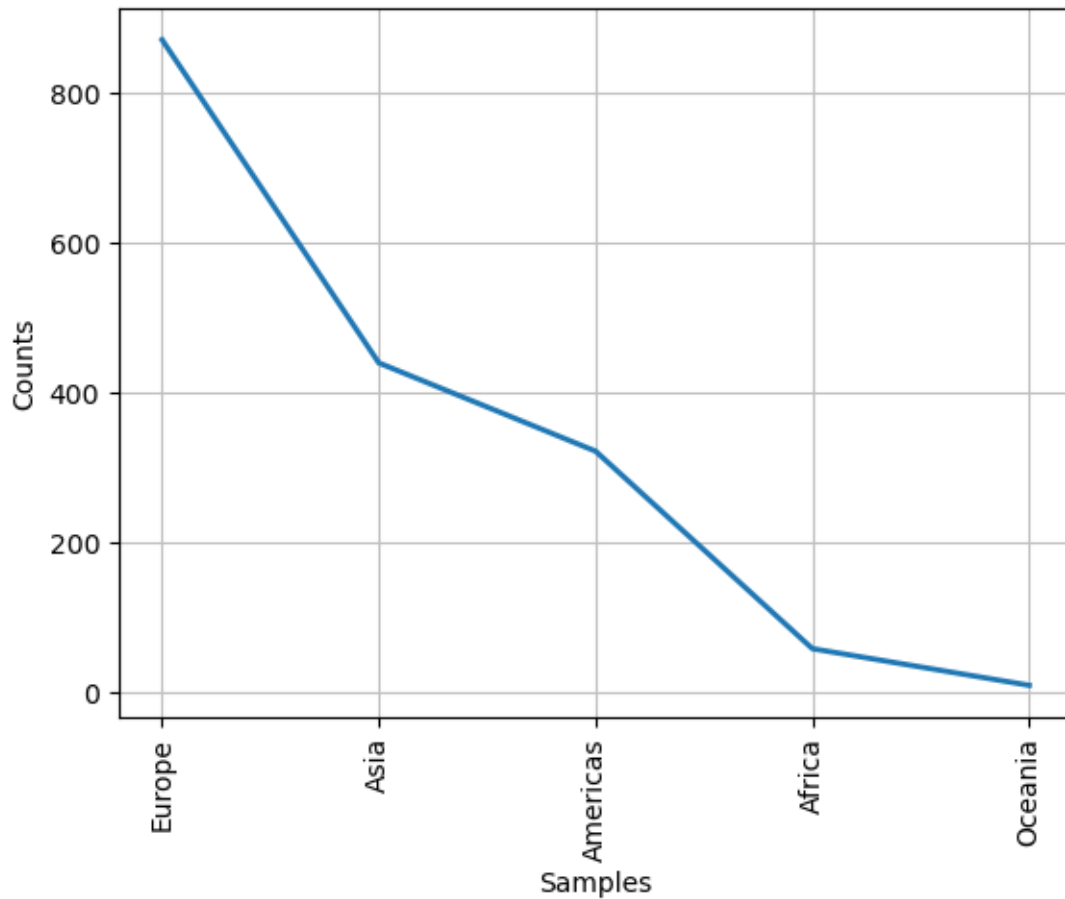
3.4 Number of the country names mentioned per era

```
[55]: plt.rcParams["figure.figsize"] = (5,5)
      x = np.arange(4)
      years = ['era1', 'era2', 'era3','era4']
      values =␣
       ↪[country_mention_1,country_mention_2,country_mention_3,country_mention_4]
```

22

```
plt.bar(x, values,color=['#090088','#930077','#E4007C','#FFBD39'])
plt.xticks(x, years)
plt.ylim([60, 72])
plt.title("Number of the country names mentioned")

plt.show()
```
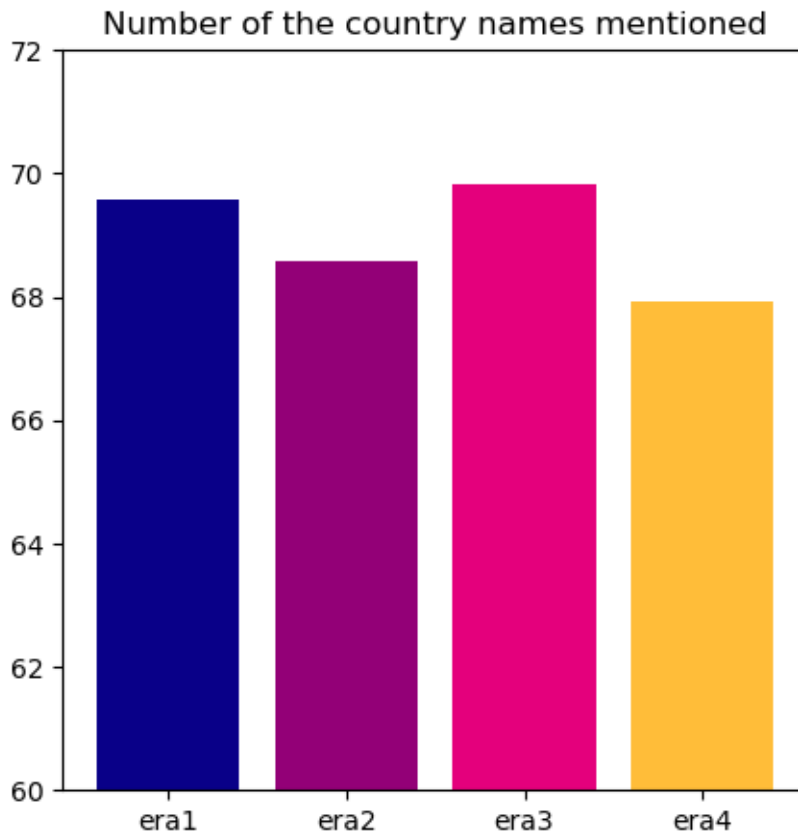

3.5 Diversity of country names mentioned per era

```
[56]: variation_1 = len(set(full_country_1))/len(full_country_1) * 100
      variation_2 = len(set(full_country_2))/len(full_country_2) * 100
      variation_3 = len(set(full_country_3))/len(full_country_3) * 100
      variation_4 = len(set(full_country_4))/len(full_country_4) * 100
```

```
[57]: plt.rcParams["figure.figsize"] = (5,5)
      x = np.arange(4)
      years = ['era1', 'era2', 'era3','era4']
      values = [variation_1,variation_2,variation_3,variation_4]

      plt.bar(x, values,color=['#090088','#930077','#E4007C','#FFBD39'])
```

```
plt.xticks(x, years)
plt.title("Diversity of country names mentioned")

plt.show()
```

Diversity of country names mentioned

4 LIWC sentiment analysis

4.1 Era 1: 1980 - 1989

```
[58]: df1_liwc = pd.read_csv('./era1_LIWC2015.csv')
      df1_liwc = df1_liwc.drop("Source (A)",axis=1)

      df1_liwc.insert(1,"Country","")
      df1_liwc.insert(2,"Continent","")
      df1_liwc["Country"] = df_1["Country"]
      df1_liwc["Continent"] = df_1["Continent"]
      # Exclude USA
      df1_liwc = df1_liwc[df1_liwc['Country'] != "United States of America"]


      df1_liwc
```

[58]:

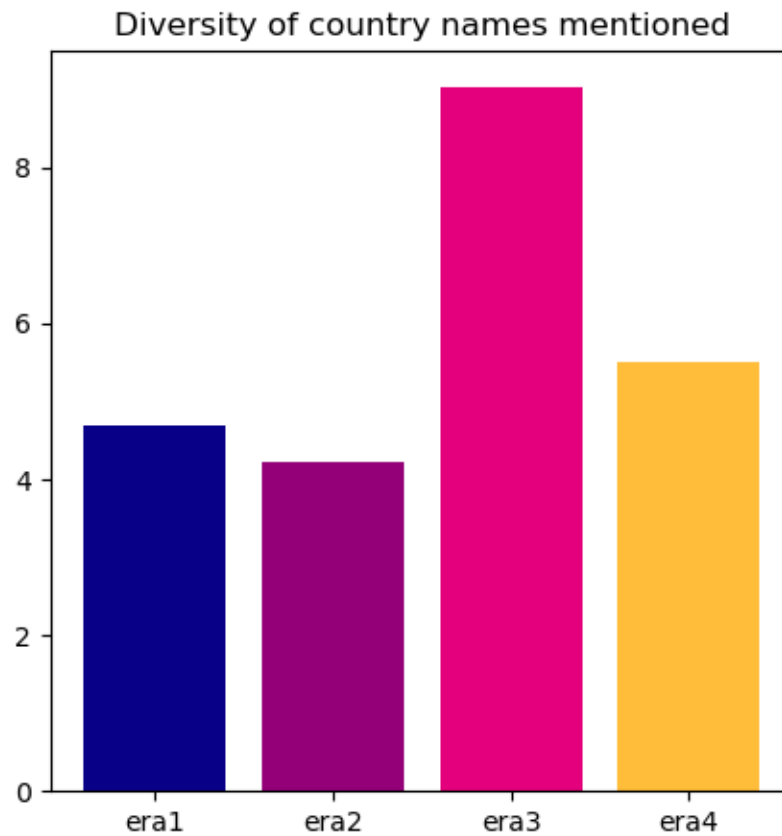|	Source (B)	Country	Continent
0	Perhaps we find portents in curious places but...		
1	OFTEN, in the 23 years since I first joined Th...	Greece	Europe
2	Q. I recently created a key lime pie from one ...	Spain	Europe
3	For SportsMonday By NELSON BRYANT ASHORT while...	Canada	Americas
4	NOT long ago I had planned to serve four fairl...		
...	...	...	...
1560	LEAD: PLAYING culinary ''Beat the Clock'' has ...		
1561	LEAD: THE local strawberry season has started...	Italy	Europe
1562	LEAD: DON'T think that because tomorrow is New...	France	Europe
1563	LEAD: ONE of the treasures of the kitchen is a...	France	Europe
1564	LEAD: DON'T think that because tomorrow is New...	France	Europe

	Source (C)
0	NaN
1	NaN
2	NaN
3	NaN
4	NaN
...	...
1560	COOKING AND COOKBOOKS; RECIPES
1561	STRAWBERRIES; COOKING AND COOKBOOKS
1562	FOOD; RECIPES; CHRISTMAS
1563	COOKING AND COOKBOOKS; RECIPES
1564	FOOD; CHRISTMAS; RECIPES

	Source (D)
0	FOOD THE FISH OF POETS
1	EVOLUTION OF A RECIPE:VARIATIONS ON A VENERABL...
2	QUESTIONS AND ANSWERS
3	OUTDOORS:BAYBERRIES ARE ALWAYS A GOOD PICK
4	60-MINUTE GOURMET
...	...
1560	FOOD; A Meal That Takes Imagination, Not All Day
1561	FOOD; Strawberries Are Here and It's Time for ...

```
1562                 FOOD; Christmas Just Keeps On Going
1563         FOOD; Whipping Up Canapes on Short Notice
1564                 FOOD; Christmas Just Keeps On Going

                                          Source (E)  Source (F)  \
0     New York Times, Late Edition (East Coast); New...      1980.0
1     New York Times, Late Edition (East Coast); New...      1980.0
2     New York Times, Late Edition (East Coast); New...      1980.0
3     New York Times, Late Edition (East Coast); New...      1980.0
4     New York Times, Late Edition (East Coast); New...      1980.0
...                                              ...         ...
1560  New York Times, Late Edition (East Coast); New...      1989.0
1561  New York Times, Late Edition (East Coast); New...      1989.0
1562  New York Times, Late Edition (East Coast); New...      1989.0
1563  New York Times, Late Edition (East Coast); New...      1989.0
1564  New York Times, Late Edition (East Coast); New...      1989.0

          Source (G)    WC  Analytic  ...  Comma  Colon  SemiC  QMark  Exclam  \
0     New York, N.Y.  1019     97.33  ...   3.83   0.29   0.10   0.10     0.0
1     New York, N.Y.  1697     94.57  ...   4.48   0.53   0.18   0.00     0.0
2     New York, N.Y.   624     91.10  ...   4.49   0.16   0.00   0.64     0.0
3     New York, N.Y.  1388     93.58  ...   5.40   0.00   0.07   0.00     0.0
4     New York, N.Y.   776     98.08  ...   2.32   0.39   0.00   0.00     0.0
...              ...   ...       ...  ...    ...    ...    ...    ...     ...
1560  New York, N.Y.   639     96.97  ...   5.01   1.56   0.00   0.00     0.0
1561  New York, N.Y.   889     98.40  ...   3.49   1.24   0.11   0.00     0.0
1562  New York, N.Y.  1445     98.19  ...   5.67   0.83   0.07   0.00     0.0
1563  New York, N.Y.  1033     98.09  ...   1.84   1.16   0.00   0.00     0.0
1564  New York, N.Y.  1445     98.19  ...   5.67   0.83   0.07   0.00     0.0

      Dash  Quote  Apostro  Parenth  OtherP
0     0.98    0.0     1.18     0.98    0.98
1     0.59    0.0     1.18     0.94    0.65
2     0.16    0.0     1.28     0.64    0.48
3     1.95    0.0     0.94     0.72    0.00
4     0.26    0.0     0.13     1.55    0.64
...    ...    ...      ...      ...     ...
1560  0.94    0.0     1.25     0.00    0.78
1561  1.57    0.0     0.11     0.22    0.45
1562  1.31    0.0     1.94     0.42    1.04
1563  0.68    0.0     0.19     0.58    0.29
1564  1.31    0.0     1.94     0.42    1.04

[1409 rows x 101 columns]
```

4.1.1 Use groupby function to produce the mean value in each quantitative column for each country

```
[59]: groupby_coun_mean_df_1 = df1_liwc.groupby("Country").mean(numeric_only=True)
      groupby_coun_mean_df_1 = groupby_coun_mean_df_1.drop(groupby_coun_mean_df_1.
       →index[0])
      groupby_coun_mean_df_1 = groupby_coun_mean_df_1.drop("Source (F)",axis=1)
      groupby_coun_mean_df_1
```

[59]:

Country	WC	Analytic	Clout	Authentic	Tone \
Afghanistan	2078.000000	94.380000	58.740000	18.370000	29.800000
Argentina	2567.000000	98.110000	52.030000	14.780000	27.710000
Armenia	4330.000000	93.470000	43.940000	24.620000	31.270000
Austria	1194.083333	95.870000	56.314167	14.162500	42.167500
Barbados	685.000000	88.370000	36.290000	25.670000	15.500000
Belgium	833.142857	97.494286	47.518571	20.001429	31.001429
Bermuda	541.000000	90.295000	48.145000	24.885000	23.545000
Brazil	1744.666667	95.586667	47.893333	18.612222	38.496667
Bulgaria	1118.000000	96.450000	42.540000	9.800000	35.120000
Burma	1912.000000	94.640000	63.310000	20.990000	24.930000
Canada	1059.692308	95.527692	48.241538	19.528462	41.510000
China	1402.625000	95.066641	48.824375	18.128047	35.558750
Denmark	947.500000	89.425000	54.180000	10.857500	34.347500
Egypt	1174.250000	97.278333	55.270833	23.430833	39.959167
Estonia	899.000000	97.170000	60.540000	25.940000	52.920000
France	1526.578462	96.130708	50.012646	17.612769	41.174892
Georgia	2040.666667	98.043333	51.456667	18.253333	34.220000
Germany	1404.285714	94.748571	53.110000	15.520000	32.054286
Greece	1025.709677	95.969677	45.147742	15.301613	40.556452
Hungary	1649.250000	96.645000	46.395000	14.622500	44.110000
India	1725.800000	94.903600	52.015600	17.686000	31.194000
Indonesia	1516.500000	95.740000	46.640000	7.640000	18.345000
Ireland	1994.000000	89.526000	56.042000	19.410000	43.746000
Israel	2143.000000	87.490000	51.870000	17.530000	30.500000
Italy	1384.706140	95.111140	49.084649	17.567368	39.806184
Jamaica	2673.000000	95.940000	51.050000	17.590000	28.260000
Japan	1699.535714	95.610357	50.469643	18.332143	43.664643
Jersey	1614.125000	95.925000	47.405000	18.570000	42.515000
Latvia	1996.000000	97.610000	59.700000	11.290000	26.600000
Lebanon	1979.333333	95.763333	59.640000	14.326667	62.370000
Luxembourg	2394.000000	97.740000	51.840000	21.620000	47.390000
Malaysia	1934.500000	94.100000	48.880000	14.080000	29.370000
Martinique	1348.000000	92.170000	42.640000	5.820000	21.220000
Mexico	1447.896552	95.712069	49.854483	17.680690	42.423793
Morocco	1166.954545	95.141818	49.725455	18.417273	41.380909
Netherlands	1650.142857	94.834286	54.525000	13.259286	41.741429

Norway	1453.000000	95.360000	48.900000	11.630000	22.570000
Palestine	1909.000000	95.720000	64.710000	12.660000	54.370000
Peru	978.000000	96.814000	48.882000	8.342000	27.174000
Poland	1450.750000	91.037500	45.872500	14.687500	42.110000
Portugal	1766.666667	91.348333	54.671667	17.136667	46.013333
Russian Federation	1465.200000	95.214000	49.008000	12.566000	43.070000
Singapore	1710.000000	95.510000	57.875000	14.825000	52.060000
Spain	1180.925000	95.416250	48.128000	19.387250	38.898750
Sweden	2310.142857	95.510000	48.870000	15.304286	42.837143
Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769
Syria	700.000000	97.730000	56.250000	27.590000	55.390000
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667

	WPS	Sixltr	Dic	function	pronoun	... \
Country						...
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...
China	14.150937	19.131484	66.323203	36.076797	3.350234	...
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...
France	14.303323	18.144246	68.253969	38.043754	3.987077	...
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...
India	15.218800	18.877600	67.590000	36.448000	4.284800	...
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...

```
Lebanon              17.886667  19.320000  69.653333  38.993333  4.616667  ...
Luxembourg           18.420000  15.080000  67.540000  37.760000  2.550000  ...
Malaysia             11.365000  19.785000  65.610000  33.875000  2.765000  ...
Martinique           15.860000  17.580000  61.200000  32.640000  2.970000  ...
Mexico               14.475517  19.086724  66.820172  37.476552  4.035690  ...
Morocco              15.092727  19.106364  67.562273  39.191364  4.010000  ...
Netherlands          15.422143  19.239286  66.140714  36.776429  4.399286  ...
Norway               18.390000  18.860000  66.690000  36.340000  2.960000  ...
Palestine            19.680000  22.470000  68.100000  38.340000  5.190000  ...
Peru                 12.648000  17.694000  64.694000  35.894000  2.342000  ...
Poland               15.837500  17.127500  69.510000  37.850000  5.610000  ...
Portugal             13.598333  19.120000  70.511667  39.573333  6.020000  ...
Russian Federation   12.856000  18.190000  65.362000  35.560000  3.202000  ...
Singapore            16.845000  19.620000  71.405000  37.830000  3.595000  ...
Spain                14.534250  18.534500  68.586500  38.346250  3.595000  ...
Sweden               13.571429  19.244286  65.941429  34.744286  3.494286  ...
Switzerland          14.965385  18.973077  67.793846  37.250769  3.877692  ...
Syria                14.580000  21.430000  72.860000  38.710000  3.290000  ...
Thailand             15.767143  19.845714  67.105714  36.802857  4.047143  ...
Turkey               13.855000  19.630000  65.350000  36.353333  3.866667  ...
United Kingdom       13.719412  17.574118  68.757647  38.407647  4.081765  ...
Vietnam              15.136667  19.066667  67.590000  37.188333  4.503333  ...

                     Comma     Colon     SemiC     QMark     Exclam   \
Country
Afghanistan          7.600000  0.290000  0.140000  0.000000  0.000000
Argentina            6.660000  0.700000  0.190000  0.000000  0.000000
Armenia              6.210000  0.300000  0.050000  0.000000  0.000000
Austria              5.333333  0.831667  0.085000  0.071667  0.000000
Barbados             5.840000  0.290000  0.150000  0.000000  0.000000
Belgium              5.490000  0.390000  0.255714  0.000000  0.000000
Bermuda              4.840000  0.505000  0.235000  0.305000  0.000000
Brazil               6.341111  0.320000  0.076667  0.032222  0.011111
Bulgaria             5.460000  0.540000  0.090000  0.000000  0.000000
Burma                6.540000  1.150000  0.210000  0.000000  0.050000
Canada               4.960769  0.364615  0.065385  0.000000  0.000000
China                5.492500  0.581406  0.168281  0.035469  0.002812
Denmark              6.440000  0.605000  0.015000  0.132500  0.000000
Egypt                5.274167  0.928333  0.063333  0.011667  0.000000
Estonia              5.780000  0.330000  0.110000  0.110000  0.000000
France               5.226800  0.526092  0.117200  0.035785  0.004154
Georgia              5.560000  0.356667  0.086667  0.013333  0.016667
Germany              4.552857  0.454286  0.184286  0.085714  0.000000
Greece               5.346129  0.605161  0.123871  0.000000  0.000000
Hungary              4.495000  0.487500  0.235000  0.000000  0.000000
India                6.070800  0.469200  0.136800  0.014400  0.006000
Indonesia            6.570000  0.375000  0.180000  0.000000  0.000000
```

Ireland	5.504000	0.800000	0.210000	0.332000	0.000000
Israel	6.350000	0.470000	0.050000	0.000000	0.000000
Italy	5.460132	0.601667	0.125175	0.030044	0.004868
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000
Japan	5.297500	0.683214	0.130000	0.017500	0.004643
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000
Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000
Norway	5.640000	0.960000	0.210000	0.000000	0.000000
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000
Peru	5.628000	0.550000	0.026000	0.000000	0.000000
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000

```
France             1.153569  0.004892  1.444185  0.876677  1.249108
Georgia            0.943333  0.000000  1.450000  0.526667  2.063333
Germany            1.372857  0.004286  1.282857  0.301429  3.200000
Greece             1.011613  0.006452  0.725161  0.410968  1.102581
Hungary            0.982500  0.000000  0.560000  0.612500  2.255000
India              1.351600  0.000000  1.991200  0.691200  2.030400
Indonesia          1.430000  0.030000  0.665000  1.780000  1.580000
Ireland            1.330000  0.000000  3.254000  0.616000  1.206000
Israel             1.070000  0.000000  3.450000  0.930000  1.260000
Italy              1.134518  0.004561  1.355307  0.780746  1.277851
Jamaica            1.270000  0.000000  1.420000  1.720000  2.920000
Japan              1.207857  0.000000  1.271429  0.810000  1.641071
Jersey             0.841250  0.000000  1.142500  1.323750  3.186250
Latvia             1.500000  0.000000  5.760000  0.200000  2.710000
Lebanon            1.040000  0.000000  1.510000  0.690000  1.386667
Luxembourg         2.800000  0.000000  2.300000  0.630000  1.040000
Malaysia           1.375000  0.000000  1.440000  0.530000  4.075000
Martinique         1.410000  0.000000  0.300000  0.590000  6.080000
Mexico             1.539828  0.001552  1.297759  0.895690  1.517241
Morocco            0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands        1.603571  0.000000  2.865000  0.672857  1.208571
Norway             0.760000  0.000000  0.140000  2.060000  1.650000
Palestine          1.520000  0.000000  3.820000  0.840000  0.470000
Peru               1.168000  0.000000  0.572000  0.368000  0.656000
Poland             1.010000  0.000000  2.065000  0.880000  0.865000
Portugal           1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation 1.280000  0.000000  1.440000  1.126000  1.060000
Singapore          1.110000  0.000000  2.310000  0.235000  0.760000
Spain              1.196750  0.002000  1.062000  0.897000  1.733500
Sweden             1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland        1.075385  0.003846  1.330769  0.756923  1.960769
Syria              2.570000  0.000000  3.000000  0.860000  0.430000
Thailand           1.134286  0.000000  2.298571  1.081429  1.437143
Turkey             1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom     0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam            1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.1.2 Use groupby function to produce the mean value in each quantitative column for each continent

```
[60]: groupby_con_mean_df_1 = df1_liwc.groupby("Country").mean(numeric_only=True)
      groupby_con_mean_df_1 = groupby_con_mean_df_1.drop(groupby_con_mean_df_1.
        ↪index[0])
      groupby_con_mean_df_1 = groupby_con_mean_df_1.drop("Source (F)",axis=1)
      groupby_con_mean_df_1
```

```
[60]:                         WC    Analytic       Clout   Authentic        Tone  \
       Country
       Afghanistan      2078.000000   94.380000   58.740000   18.370000   29.800000
       Argentina        2567.000000   98.110000   52.030000   14.780000   27.710000
       Armenia          4330.000000   93.470000   43.940000   24.620000   31.270000
       Austria          1194.083333   95.870000   56.314167   14.162500   42.167500
       Barbados          685.000000   88.370000   36.290000   25.670000   15.500000
       Belgium           833.142857   97.494286   47.518571   20.001429   31.001429
       Bermuda           541.000000   90.295000   48.145000   24.885000   23.545000
       Brazil           1744.666667   95.586667   47.893333   18.612222   38.496667
       Bulgaria         1118.000000   96.450000   42.540000    9.800000   35.120000
       Burma            1912.000000   94.640000   63.310000   20.990000   24.930000
       Canada           1059.692308   95.527692   48.241538   19.528462   41.510000
       China            1402.625000   95.066641   48.824375   18.128047   35.558750
       Denmark           947.500000   89.425000   54.180000   10.857500   34.347500
       Egypt            1174.250000   97.278333   55.270833   23.430833   39.959167
       Estonia           899.000000   97.170000   60.540000   25.940000   52.920000
       France           1526.578462   96.130708   50.012646   17.612769   41.174892
       Georgia          2040.666667   98.043333   51.456667   18.253333   34.220000
       Germany          1404.285714   94.748571   53.110000   15.520000   32.054286
       Greece           1025.709677   95.969677   45.147742   15.301613   40.556452
       Hungary          1649.250000   96.645000   46.395000   14.622500   44.110000
       India            1725.800000   94.903600   52.015600   17.686000   31.194000
       Indonesia        1516.500000   95.740000   46.640000    7.640000   18.345000
       Ireland          1994.000000   89.526000   56.042000   19.410000   43.746000
       Israel           2143.000000   87.490000   51.870000   17.530000   30.500000
       Italy            1384.706140   95.111140   49.084649   17.567368   39.806184
       Jamaica          2673.000000   95.940000   51.050000   17.590000   28.260000
       Japan            1699.535714   95.610357   50.469643   18.332143   43.664643
       Jersey           1614.125000   95.925000   47.405000   18.570000   42.515000
       Latvia           1996.000000   97.610000   59.700000   11.290000   26.600000
       Lebanon          1979.333333   95.763333   59.640000   14.326667   62.370000
       Luxembourg       2394.000000   97.740000   51.840000   21.620000   47.390000
       Malaysia         1934.500000   94.100000   48.880000   14.080000   29.370000
       Martinique       1348.000000   92.170000   42.640000    5.820000   21.220000
       Mexico           1447.896552   95.712069   49.854483   17.680690   42.423793
       Morocco          1166.954545   95.141818   49.725455   18.417273   41.380909
       Netherlands      1650.142857   94.834286   54.525000   13.259286   41.741429
       Norway           1453.000000   95.360000   48.900000   11.630000   22.570000
       Palestine        1909.000000   95.720000   64.710000   12.660000   54.370000
       Peru              978.000000   96.814000   48.882000    8.342000   27.174000
       Poland           1450.750000   91.037500   45.872500   14.687500   42.110000
       Portugal         1766.666667   91.348333   54.671667   17.136667   46.013333
       Russian Federation 1465.200000  95.214000  49.008000   12.566000   43.070000
       Singapore        1710.000000   95.510000   57.875000   14.825000   52.060000
       Spain            1180.925000   95.416250   48.128000   19.387250   38.898750
       Sweden           2310.142857   95.510000   48.870000   15.304286   42.837143
```

Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769
Syria	700.000000	97.730000	56.250000	27.590000	55.390000
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667

	WPS	Sixltr	Dic	function	pronoun	...	\
Country						...	
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...	
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...	
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...	
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...	
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...	
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...	
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...	
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...	
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...	
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...	
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...	
China	14.150937	19.131484	66.323203	36.076797	3.350234	...	
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...	
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...	
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...	
France	14.303323	18.144246	68.253969	38.043754	3.987077	...	
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...	
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...	
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...	
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...	
India	15.218800	18.877600	67.590000	36.448000	4.284800	...	
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...	
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...	
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...	
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...	
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...	
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...	
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...	
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...	
Lebanon	17.886667	19.320000	69.653333	38.993333	4.616667	...	
Luxembourg	18.420000	15.080000	67.540000	37.760000	2.550000	...	
Malaysia	11.365000	19.785000	65.610000	33.875000	2.765000	...	
Martinique	15.860000	17.580000	61.200000	32.640000	2.970000	...	
Mexico	14.475517	19.086724	66.820172	37.476552	4.035690	...	
Morocco	15.092727	19.106364	67.562273	39.191364	4.010000	...	
Netherlands	15.422143	19.239286	66.140714	36.776429	4.399286	...	
Norway	18.390000	18.860000	66.690000	36.340000	2.960000	...	
Palestine	19.680000	22.470000	68.100000	38.340000	5.190000	...	

Peru	12.648000	17.694000	64.694000	35.894000	2.342000	...
Poland	15.837500	17.127500	69.510000	37.850000	5.610000	...
Portugal	13.598333	19.120000	70.511667	39.573333	6.020000	...
Russian Federation	12.856000	18.190000	65.362000	35.560000	3.202000	...
Singapore	16.845000	19.620000	71.405000	37.830000	3.595000	...
Spain	14.534250	18.534500	68.586500	38.346250	3.595000	...
Sweden	13.571429	19.244286	65.941429	34.744286	3.494286	...
Switzerland	14.965385	18.973077	67.793846	37.250769	3.877692	...
Syria	14.580000	21.430000	72.860000	38.710000	3.290000	...
Thailand	15.767143	19.845714	67.105714	36.802857	4.047143	...
Turkey	13.855000	19.630000	65.350000	36.353333	3.866667	...
United Kingdom	13.719412	17.574118	68.757647	38.407647	4.081765	...
Vietnam	15.136667	19.066667	67.590000	37.188333	4.503333	...

	Comma	Colon	SemiC	QMark	Exclam	\
Country						
Afghanistan	7.600000	0.290000	0.140000	0.000000	0.000000	
Argentina	6.660000	0.700000	0.190000	0.000000	0.000000	
Armenia	6.210000	0.300000	0.050000	0.000000	0.000000	
Austria	5.333333	0.831667	0.085000	0.071667	0.000000	
Barbados	5.840000	0.290000	0.150000	0.000000	0.000000	
Belgium	5.490000	0.390000	0.255714	0.000000	0.000000	
Bermuda	4.840000	0.505000	0.235000	0.305000	0.000000	
Brazil	6.341111	0.320000	0.076667	0.032222	0.011111	
Bulgaria	5.460000	0.540000	0.090000	0.000000	0.000000	
Burma	6.540000	1.150000	0.210000	0.000000	0.050000	
Canada	4.960769	0.364615	0.065385	0.000000	0.000000	
China	5.492500	0.581406	0.168281	0.035469	0.002812	
Denmark	6.440000	0.605000	0.015000	0.132500	0.000000	
Egypt	5.274167	0.928333	0.063333	0.011667	0.000000	
Estonia	5.780000	0.330000	0.110000	0.110000	0.000000	
France	5.226800	0.526092	0.117200	0.035785	0.004154	
Georgia	5.560000	0.356667	0.086667	0.013333	0.016667	
Germany	4.552857	0.454286	0.184286	0.085714	0.000000	
Greece	5.346129	0.605161	0.123871	0.000000	0.000000	
Hungary	4.495000	0.487500	0.235000	0.000000	0.000000	
India	6.070800	0.469200	0.136800	0.014400	0.006000	
Indonesia	6.570000	0.375000	0.180000	0.000000	0.000000	
Ireland	5.504000	0.800000	0.210000	0.332000	0.000000	
Israel	6.350000	0.470000	0.050000	0.000000	0.000000	
Italy	5.460132	0.601667	0.125175	0.030044	0.004868	
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000	
Japan	5.297500	0.683214	0.130000	0.017500	0.004643	
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000	
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000	
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667	
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000	

Country					
Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000
Norway	5.640000	0.960000	0.210000	0.000000	0.000000
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000
Peru	5.628000	0.550000	0.026000	0.000000	0.000000
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000
France	1.153569	0.004892	1.444185	0.876677	1.249108
Georgia	0.943333	0.000000	1.450000	0.526667	2.063333
Germany	1.372857	0.004286	1.282857	0.301429	3.200000
Greece	1.011613	0.006452	0.725161	0.410968	1.102581
Hungary	0.982500	0.000000	0.560000	0.612500	2.255000
India	1.351600	0.000000	1.991200	0.691200	2.030400
Indonesia	1.430000	0.030000	0.665000	1.780000	1.580000
Ireland	1.330000	0.000000	3.254000	0.616000	1.206000
Israel	1.070000	0.000000	3.450000	0.930000	1.260000

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Italy               1.134518  0.004561  1.355307  0.780746  1.277851
Jamaica             1.270000  0.000000  1.420000  1.720000  2.920000
Japan               1.207857  0.000000  1.271429  0.810000  1.641071
Jersey              0.841250  0.000000  1.142500  1.323750  3.186250
Latvia              1.500000  0.000000  5.760000  0.200000  2.710000
Lebanon             1.040000  0.000000  1.510000  0.690000  1.386667
Luxembourg          2.800000  0.000000  2.300000  0.630000  1.040000
Malaysia            1.375000  0.000000  1.440000  0.530000  4.075000
Martinique          1.410000  0.000000  0.300000  0.590000  6.080000
Mexico              1.539828  0.001552  1.297759  0.895690  1.517241
Morocco             0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands         1.603571  0.000000  2.865000  0.672857  1.208571
Norway              0.760000  0.000000  0.140000  2.060000  1.650000
Palestine           1.520000  0.000000  3.820000  0.840000  0.470000
Peru                1.168000  0.000000  0.572000  0.368000  0.656000
Poland              1.010000  0.000000  2.065000  0.880000  0.865000
Portugal            1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation  1.280000  0.000000  1.440000  1.126000  1.060000
Singapore           1.110000  0.000000  2.310000  0.235000  0.760000
Spain               1.196750  0.002000  1.062000  0.897000  1.733500
Sweden              1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland         1.075385  0.003846  1.330769  0.756923  1.960769
Syria               2.570000  0.000000  3.000000  0.860000  0.430000
Thailand            1.134286  0.000000  2.298571  1.081429  1.437143
Turkey              1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom      0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam             1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.1.3 Show only the columns of "Affective processes" and its sub-codes

```
[61]: groupby_coun_mean_df_1[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]
```

```
[61]:                  affect    posemo    negemo       anx     anger       sad
      Country
      Afghanistan     2.940000  1.590000  1.350000  0.000000  0.430000  0.140000
      Argentina       1.600000  0.860000  0.740000  0.040000  0.350000  0.040000
      Armenia         3.280000  1.800000  1.480000  0.050000  0.760000  0.180000
      Austria         2.810833  1.855833  0.956667  0.012500  0.585000  0.274167
      Barbados        2.920000  1.020000  1.750000  0.290000  0.440000  0.000000
      Belgium         2.187143  1.200000  0.984286  0.230000  0.405714  0.057143
      Bermuda         2.775000  1.305000  1.470000  0.150000  0.230000  0.120000
      Brazil          2.767778  1.716667  1.013333  0.087778  0.233333  0.237778
      Bulgaria        1.610000  1.070000  0.540000  0.090000  0.090000  0.090000
      Burma           2.040000  0.990000  1.050000  0.050000  0.680000  0.260000
      Canada          2.911538  1.883077  1.023077  0.181538  0.341538  0.160769
```

China	2.635078	1.560156	1.043281	0.049766	0.481250	0.196094
Denmark	3.295000	1.862500	1.370000	0.140000	0.402500	0.297500
Egypt	2.270000	1.510000	0.730833	0.065833	0.330000	0.044167
Estonia	2.780000	2.110000	0.670000	0.000000	0.440000	0.000000
France	2.739415	1.757415	0.928062	0.086862	0.365077	0.143200
Georgia	2.493333	1.416667	0.966667	0.090000	0.393333	0.043333
Germany	2.295714	1.312857	0.982857	0.092857	0.534286	0.195714
Greece	2.128387	1.460323	0.653871	0.069355	0.220323	0.173226
Hungary	2.382500	1.687500	0.695000	0.055000	0.220000	0.075000
India	2.718000	1.474000	1.182400	0.052000	0.644000	0.184800
Indonesia	3.265000	1.345000	1.925000	0.030000	1.015000	0.075000
Ireland	3.080000	2.024000	1.044000	0.100000	0.448000	0.148000
Israel	2.150000	1.210000	0.930000	0.090000	0.470000	0.190000
Italy	2.634868	1.678465	0.923816	0.087325	0.358465	0.176316
Jamaica	2.580000	1.350000	1.200000	0.070000	0.670000	0.150000
Japan	2.291071	1.596071	0.636786	0.069286	0.279643	0.110357
Jersey	2.957500	1.933750	1.016250	0.042500	0.577500	0.257500
Latvia	2.350000	1.200000	1.150000	0.000000	0.350000	0.200000
Lebanon	3.223333	2.590000	0.616667	0.156667	0.173333	0.073333
Luxembourg	2.420000	1.800000	0.630000	0.000000	0.290000	0.080000
Malaysia	2.945000	1.515000	1.335000	0.210000	0.525000	0.060000
Martinique	2.970000	1.340000	1.630000	0.150000	0.890000	0.070000
Mexico	2.617414	1.745690	0.846034	0.087069	0.329655	0.134828
Morocco	2.416364	1.610000	0.776818	0.010909	0.361818	0.148636
Netherlands	2.738571	1.794286	0.925714	0.058571	0.427143	0.155000
Norway	3.230000	1.510000	1.720000	0.000000	0.690000	0.140000
Palestine	3.090000	2.300000	0.790000	0.050000	0.370000	0.050000
Peru	2.462000	1.260000	1.194000	0.026000	0.480000	0.158000
Poland	2.607500	1.732500	0.840000	0.060000	0.370000	0.150000
Portugal	3.133333	2.103333	1.015000	0.030000	0.345000	0.286667
Russian Federation	2.674000	1.790000	0.846000	0.036000	0.298000	0.108000
Singapore	3.565000	2.485000	1.085000	0.000000	0.615000	0.060000
Spain	2.604250	1.636500	0.931000	0.099750	0.406000	0.163000
Sweden	2.962857	1.934286	1.000000	0.190000	0.384286	0.140000
Switzerland	3.032308	1.784615	1.144615	0.147692	0.468462	0.145385
Syria	3.570000	2.570000	1.000000	0.140000	0.290000	0.290000
Thailand	2.557143	1.511429	0.922857	0.057143	0.372857	0.048571
Turkey	2.328333	1.535000	0.793333	0.130000	0.420000	0.125000
United Kingdom	3.079412	1.823529	1.206471	0.077647	0.408824	0.241765
Vietnam	2.860000	1.853333	0.926667	0.068333	0.368333	0.120000

```
[62]: groupby_con_mean_df_1[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]
```

[62]:

	affect	posemo	negemo	anx	anger	sad
Country						
Afghanistan	2.940000	1.590000	1.350000	0.000000	0.430000	0.140000
Argentina	1.600000	0.860000	0.740000	0.040000	0.350000	0.040000

Armenia	3.280000	1.800000	1.480000	0.050000	0.760000	0.180000
Austria	2.810833	1.855833	0.956667	0.012500	0.585000	0.274167
Barbados	2.920000	1.020000	1.750000	0.290000	0.440000	0.000000
Belgium	2.187143	1.200000	0.984286	0.230000	0.405714	0.057143
Bermuda	2.775000	1.305000	1.470000	0.150000	0.230000	0.120000
Brazil	2.767778	1.716667	1.013333	0.087778	0.233333	0.237778
Bulgaria	1.610000	1.070000	0.540000	0.090000	0.090000	0.090000
Burma	2.040000	0.990000	1.050000	0.050000	0.680000	0.260000
Canada	2.911538	1.883077	1.023077	0.181538	0.341538	0.160769
China	2.635078	1.560156	1.043281	0.049766	0.481250	0.196094
Denmark	3.295000	1.862500	1.370000	0.140000	0.402500	0.297500
Egypt	2.270000	1.510000	0.730833	0.065833	0.330000	0.044167
Estonia	2.780000	2.110000	0.670000	0.000000	0.440000	0.000000
France	2.739415	1.757415	0.928062	0.086862	0.365077	0.143200
Georgia	2.493333	1.416667	0.966667	0.090000	0.393333	0.043333
Germany	2.295714	1.312857	0.982857	0.092857	0.534286	0.195714
Greece	2.128387	1.460323	0.653871	0.069355	0.220323	0.173226
Hungary	2.382500	1.687500	0.695000	0.055000	0.220000	0.075000
India	2.718000	1.474000	1.182400	0.052000	0.644000	0.184800
Indonesia	3.265000	1.345000	1.925000	0.030000	1.015000	0.075000
Ireland	3.080000	2.024000	1.044000	0.100000	0.448000	0.148000
Israel	2.150000	1.210000	0.930000	0.090000	0.470000	0.190000
Italy	2.634868	1.678465	0.923816	0.087325	0.358465	0.176316
Jamaica	2.580000	1.350000	1.200000	0.070000	0.670000	0.150000
Japan	2.291071	1.596071	0.636786	0.069286	0.279643	0.110357
Jersey	2.957500	1.933750	1.016250	0.042500	0.577500	0.257500
Latvia	2.350000	1.200000	1.150000	0.000000	0.350000	0.200000
Lebanon	3.223333	2.590000	0.616667	0.156667	0.173333	0.073333
Luxembourg	2.420000	1.800000	0.630000	0.000000	0.290000	0.080000
Malaysia	2.945000	1.515000	1.335000	0.210000	0.525000	0.060000
Martinique	2.970000	1.340000	1.630000	0.150000	0.890000	0.070000
Mexico	2.617414	1.745690	0.846034	0.087069	0.329655	0.134828
Morocco	2.416364	1.610000	0.776818	0.010909	0.361818	0.148636
Netherlands	2.738571	1.794286	0.925714	0.058571	0.427143	0.155000
Norway	3.230000	1.510000	1.720000	0.000000	0.690000	0.140000
Palestine	3.090000	2.300000	0.790000	0.050000	0.370000	0.050000
Peru	2.462000	1.260000	1.194000	0.026000	0.480000	0.158000
Poland	2.607500	1.732500	0.840000	0.060000	0.370000	0.150000
Portugal	3.133333	2.103333	1.015000	0.030000	0.345000	0.286667
Russian Federation	2.674000	1.790000	0.846000	0.036000	0.298000	0.108000
Singapore	3.565000	2.485000	1.085000	0.000000	0.615000	0.060000
Spain	2.604250	1.636500	0.931000	0.099750	0.406000	0.163000
Sweden	2.962857	1.934286	1.000000	0.190000	0.384286	0.140000
Switzerland	3.032308	1.784615	1.144615	0.147692	0.468462	0.145385
Syria	3.570000	2.570000	1.000000	0.140000	0.290000	0.290000
Thailand	2.557143	1.511429	0.922857	0.057143	0.372857	0.048571
Turkey	2.328333	1.535000	0.793333	0.130000	0.420000	0.125000

```
United Kingdom      3.079412  1.823529  1.206471  0.077647  0.408824  0.241765
Vietnam             2.860000  1.853333  0.926667  0.068333  0.368333  0.120000
```

4.1.4 Compare negative emotions for each country

```python
[63]: plt.rcParams["figure.figsize"] = (5,13)
      groupby_coun_mean_df_1[['anx','anger','sad']].plot.barh()
```

```
[63]: <Axes: ylabel='Country'>
```

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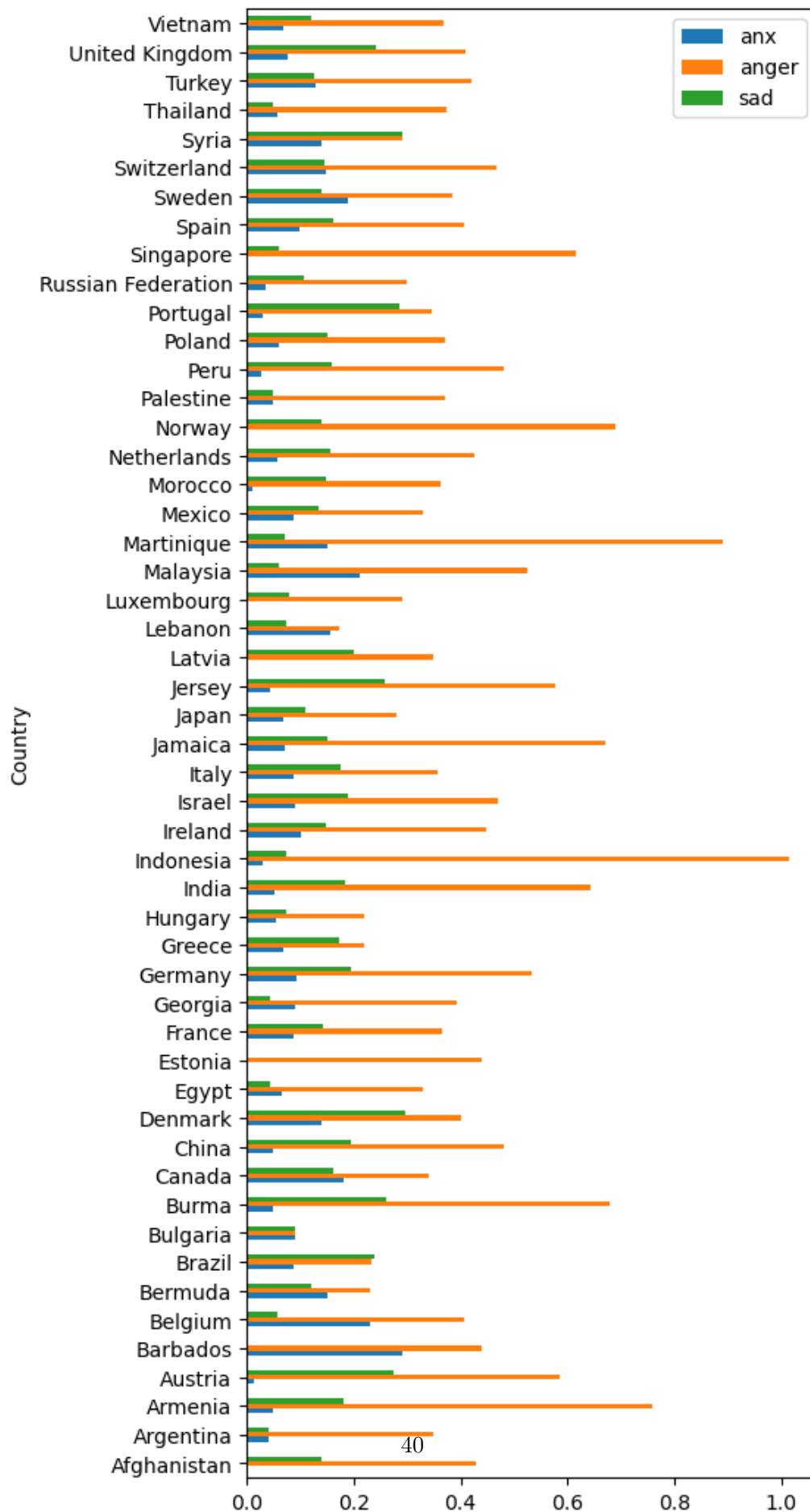
4.1.5 Compare negative emotions for each continent

```
[64]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_1[['anx','anger','sad']].plot.barh()
```

```
[64]: <Axes: ylabel='Country'>
```
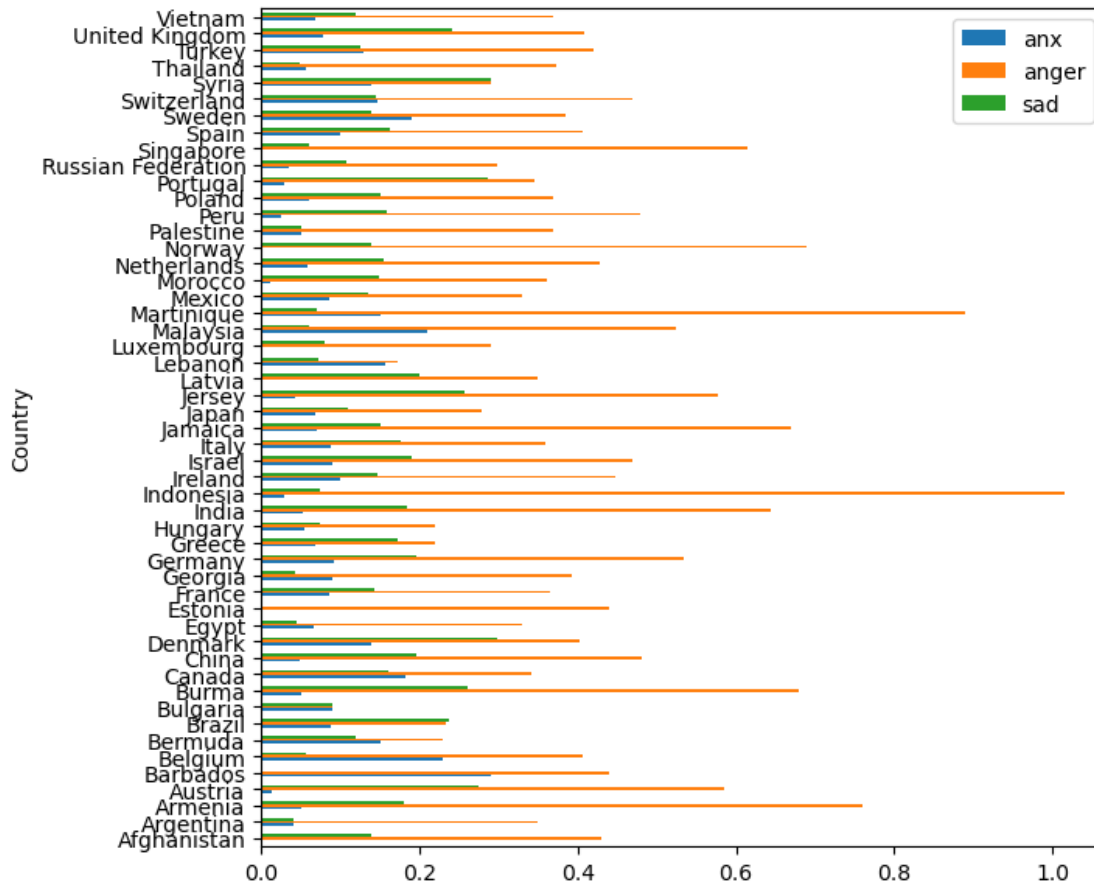

4.1.6 Compare positive end negative emotions in each country

```
[65]: plt.rcParams["figure.figsize"] = (5,13)
      groupby_coun_mean_df_1[['negemo','posemo']].plot.barh()
```

```
[65]: <Axes: ylabel='Country'>
```

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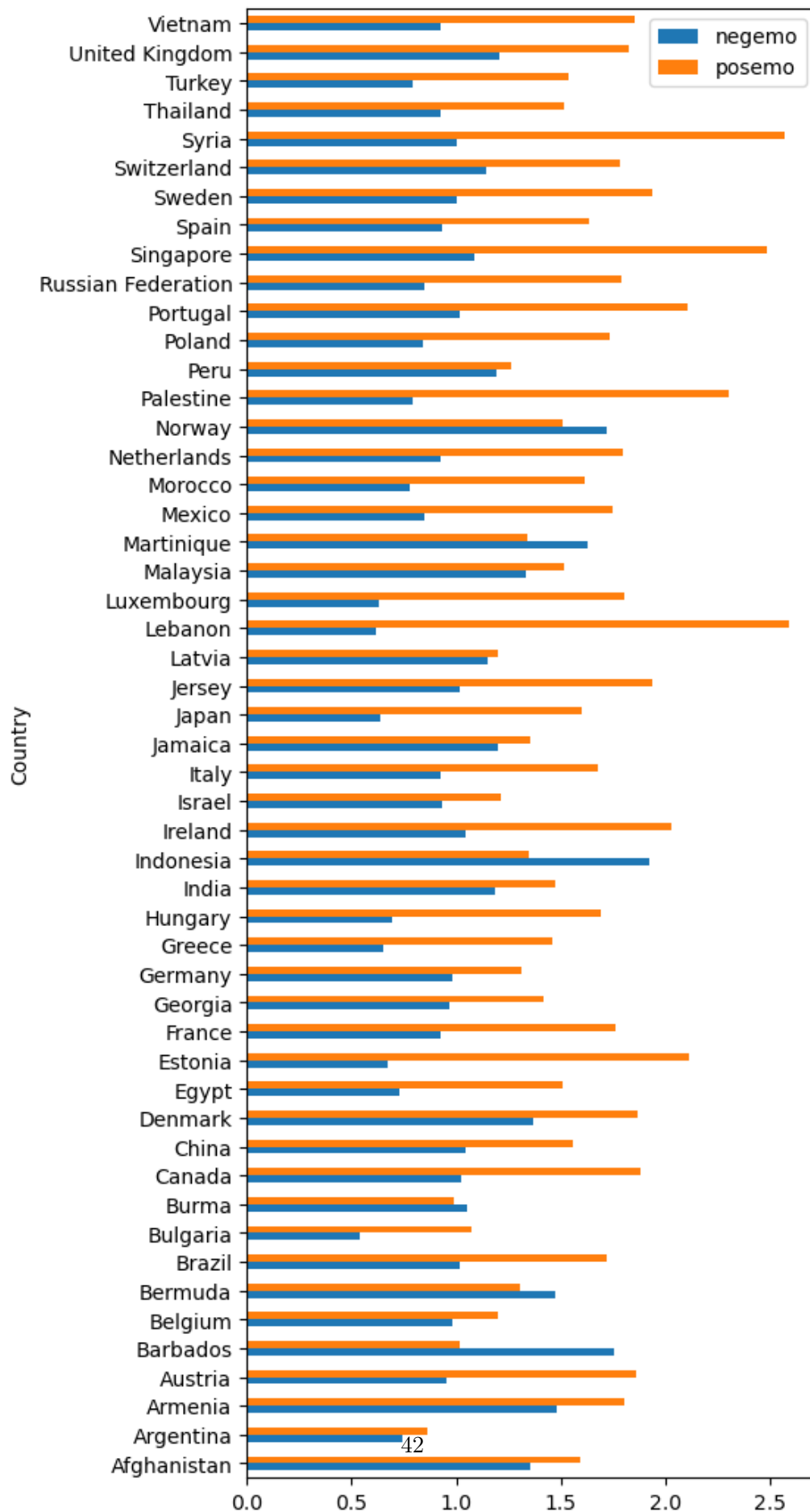
4.1.7 Compare positive end negative emotions in each continent

```
[66]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_1[['negemo','posemo']].plot.barh()
```

```
[66]: <Axes: ylabel='Country'>
```
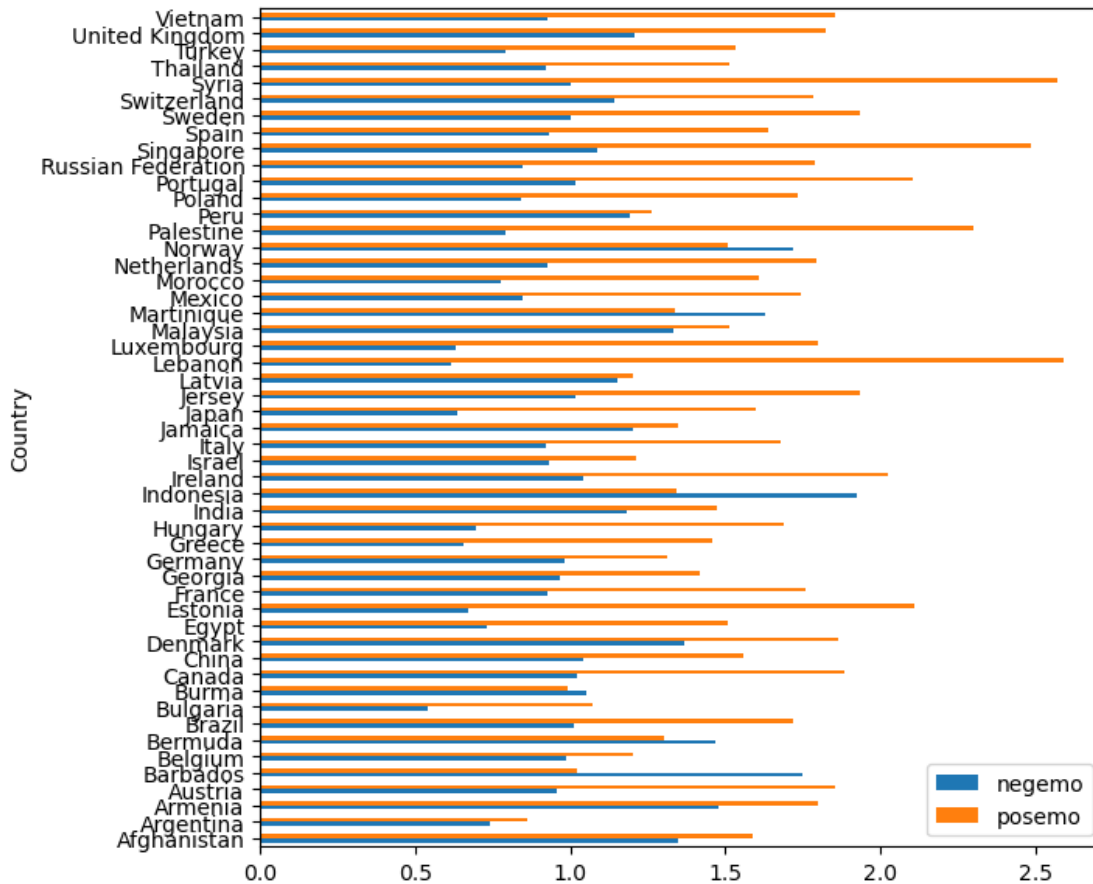

4.2 Era 2: 1990 - 1999

```
[67]: df2_liwc = pd.read_csv('./era2_LIWC2015.csv')
      df2_liwc = df2_liwc.drop("Source (A)",axis=1)

      df2_liwc.insert(1,"Country","")
      df2_liwc.insert(2,"Continent","")

      df2_liwc["Country"] = df_2["Country"]
```

```
df2_liwc["Continent"] = df_2["Continent"]
df2_liwc = df2_liwc[df2_liwc['Country'] != "United States of America"]

df2_liwc
```

[67]:

```
                                                  Source (B)  Country  Continent  \
0      LEAD: VIRGIL THOMSON used to say that when you...  France    Europe
1      LEAD: THE late Alfredo Viazzi had for years a ...   Italy    Europe
2      LEAD: THE late Alfredo Viazzi had for years a ...   Italy    Europe
4      LEAD: MOST home cooks shy away from curry for ...
5      LEAD: EVEN those who cook fairly often in the ...   Spain    Europe
...                                                   ...     ...       ...
1722   ASSUMING the planning for Thanksgiving is alre...
1723   SCALLOPS have so many virtues -- they're tende...
1725   IT'S a simple almond cake, leavened by egg whi...  France    Europe
1726   CHESTNUTS are challenging. Unlike walnuts, pec...
1727   SOMETIMES recipes say more about a place and t...  Georgia     Asia

                                         Source (C)  \
0                   COOKING AND COOKBOOKS; RECIPES
1                   COOKING AND COOKBOOKS; RECIPES
2                   COOKING AND COOKBOOKS; RECIPES
4                   COOKING AND COOKBOOKS; RECIPES
5       COOKING AND COOKBOOKS; MICROWAVE OVENS; RECIPES
...                                             ...
1722                         Cooking and Cookbooks
1723                                           NaN
1725                   Recipes; Cooking; Desserts
1726                                           NaN
1727                                           NaN

                                          Source (D)  \
0       FOOD; Having Company? You Can Still Serve a Roast
1               FOOD; Autumn Game With a Touch of Tuscany
2               FOOD; Autumn Game With a Touch of Tuscany
4                               60-MINUTE GOURMET
5                               MICROWAVE COOKING
...                                              ...
1722    Thanksgiving Cobblers That Are Easy as Pie but...
1723                          Scallops, Plus Crunch
1725              The Pastry Chef's Rich Little Secret
1726                The Chestnut Comes Out of Its Shell
1727    Recipes of the South That Speak for the People...

                                          Source (E)  Source (F)  \
0       New York Times, Late Edition (East Coast); New...    1990.0
1       New York Times, Late Edition (East Coast); New...    1990.0
```

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```
2     New York Times, Late Edition (East Coast); New...        1990.0
4     New York Times, Late Edition (East Coast); New...        1990.0
5     New York Times, Late Edition (East Coast); New...        1990.0
...                                                    ...         ...
1722  New York Times, Late Edition (East Coast); New...        1999.0
1723  New York Times, Late Edition (East Coast); New...        1999.0
1725  New York Times, Late Edition (East Coast); New...        1999.0
1726  New York Times, Late Edition (East Coast); New...        1999.0
1727  New York Times, Late Edition (East Coast); New...        1999.0

             Source (G)    WC  Analytic  ...  Comma  Colon  SemiC  QMark  Exclam  \
0     New York, N.Y.  1045     97.70  ...   3.73   1.05   0.00   0.00     0.0
1     New York, N.Y.  1308     97.68  ...   4.89   0.92   0.15   0.00     0.0
2     New York, N.Y.  1308     97.68  ...   4.89   0.92   0.15   0.00     0.0
4     New York, N.Y.   676     95.89  ...   6.51   0.74   0.00   0.00     0.0
5     New York, N.Y.  1692     97.17  ...   5.73   0.89   0.06   0.00     0.0
...              ...   ...       ...  ...    ...    ...    ...    ...     ...
1722  New York, N.Y.   707     95.41  ...   6.08   0.85   0.00   0.00     0.0
1723  New York, N.Y.   382     80.00  ...   8.38   0.79   0.26   0.00     0.0
1725  New York, N.Y.  1289     94.64  ...   6.83   0.47   0.08   0.00     0.0
1726  New York, N.Y.  1229     93.99  ...   7.97   0.73   0.08   0.00     0.0
1727  New York, N.Y.   851     94.00  ...   6.93   0.24   0.24   0.12     0.0

      Dash  Quote  Apostro  Parenth  OtherP
0     1.24    0.0     0.10     0.77    0.10
1     0.61    0.0     2.06     0.76    0.76
2     0.61    0.0     2.06     0.76    0.76
4     0.30    0.0     0.00     0.00    1.18
5     2.13    0.0     0.30     1.77    0.83
...    ...    ...      ...      ...     ...
1722  3.11    0.0     0.00     0.57    1.84
1723  1.57    0.0     0.52     1.57    0.79
1725  1.24    0.0     2.72     0.62    0.39
1726  1.30    0.0     0.98     0.81    1.22
1727  0.94    0.0     6.93     0.71    0.24

[1598 rows x 101 columns]
```

4.2.1 Use groupby function to produce the mean value in each quantitative column for each country

```
[68]: groupby_coun_mean_df_2 = df1_liwc.groupby("Country").mean(numeric_only=True)
      groupby_coun_mean_df_2 = groupby_coun_mean_df_2.drop(groupby_coun_mean_df_2.
       ↪index[0])
      groupby_coun_mean_df_2 = groupby_coun_mean_df_2.drop("Source (F)",axis=1)
      groupby_coun_mean_df_2
```

```
[68]:                          WC    Analytic      Clout  Authentic        Tone  \
      Country
      Afghanistan        2078.000000   94.380000  58.740000  18.370000  29.800000
      Argentina          2567.000000   98.110000  52.030000  14.780000  27.710000
      Armenia            4330.000000   93.470000  43.940000  24.620000  31.270000
      Austria            1194.083333   95.870000  56.314167  14.162500  42.167500
      Barbados            685.000000   88.370000  36.290000  25.670000  15.500000
      Belgium             833.142857   97.494286  47.518571  20.001429  31.001429
      Bermuda             541.000000   90.295000  48.145000  24.885000  23.545000
      Brazil             1744.666667   95.586667  47.893333  18.612222  38.496667
      Bulgaria           1118.000000   96.450000  42.540000   9.800000  35.120000
      Burma              1912.000000   94.640000  63.310000  20.990000  24.930000
      Canada             1059.692308   95.527692  48.241538  19.528462  41.510000
      China              1402.625000   95.066641  48.824375  18.128047  35.558750
      Denmark             947.500000   89.425000  54.180000  10.857500  34.347500
      Egypt              1174.250000   97.278333  55.270833  23.430833  39.959167
      Estonia             899.000000   97.170000  60.540000  25.940000  52.920000
      France             1526.578462   96.130708  50.012646  17.612769  41.174892
      Georgia            2040.666667   98.043333  51.456667  18.253333  34.220000
      Germany            1404.285714   94.748571  53.110000  15.520000  32.054286
      Greece             1025.709677   95.969677  45.147742  15.301613  40.556452
      Hungary            1649.250000   96.645000  46.395000  14.622500  44.110000
      India              1725.800000   94.903600  52.015600  17.686000  31.194000
      Indonesia          1516.500000   95.740000  46.640000   7.640000  18.345000
      Ireland            1994.000000   89.526000  56.042000  19.410000  43.746000
      Israel             2143.000000   87.490000  51.870000  17.530000  30.500000
      Italy              1384.706140   95.111140  49.084649  17.567368  39.806184
      Jamaica            2673.000000   95.940000  51.050000  17.590000  28.260000
      Japan              1699.535714   95.610357  50.469643  18.332143  43.664643
      Jersey             1614.125000   95.925000  47.405000  18.570000  42.515000
      Latvia             1996.000000   97.610000  59.700000  11.290000  26.600000
      Lebanon            1979.333333   95.763333  59.640000  14.326667  62.370000
      Luxembourg         2394.000000   97.740000  51.840000  21.620000  47.390000
      Malaysia           1934.500000   94.100000  48.880000  14.080000  29.370000
      Martinique         1348.000000   92.170000  42.640000   5.820000  21.220000
      Mexico             1447.896552   95.712069  49.854483  17.680690  42.423793
      Morocco            1166.954545   95.141818  49.725455  18.417273  41.380909
      Netherlands        1650.142857   94.834286  54.525000  13.259286  41.741429
      Norway             1453.000000   95.360000  48.900000  11.630000  22.570000
      Palestine          1909.000000   95.720000  64.710000  12.660000  54.370000
      Peru                978.000000   96.814000  48.882000   8.342000  27.174000
      Poland             1450.750000   91.037500  45.872500  14.687500  42.110000
      Portugal           1766.666667   91.348333  54.671667  17.136667  46.013333
      Russian Federation 1465.200000   95.214000  49.008000  12.566000  43.070000
      Singapore          1710.000000   95.510000  57.875000  14.825000  52.060000
      Spain              1180.925000   95.416250  48.128000  19.387250  38.898750
      Sweden             2310.142857   95.510000  48.870000  15.304286  42.837143
```

Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769
Syria	700.000000	97.730000	56.250000	27.590000	55.390000
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667

	WPS	Sixltr	Dic	function	pronoun	... \
Country						...
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...
China	14.150937	19.131484	66.323203	36.076797	3.350234	...
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...
France	14.303323	18.144246	68.253969	38.043754	3.987077	...
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...
India	15.218800	18.877600	67.590000	36.448000	4.284800	...
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...
Lebanon	17.886667	19.320000	69.653333	38.993333	4.616667	...
Luxembourg	18.420000	15.080000	67.540000	37.760000	2.550000	...
Malaysia	11.365000	19.785000	65.610000	33.875000	2.765000	...
Martinique	15.860000	17.580000	61.200000	32.640000	2.970000	...
Mexico	14.475517	19.086724	66.820172	37.476552	4.035690	...
Morocco	15.092727	19.106364	67.562273	39.191364	4.010000	...
Netherlands	15.422143	19.239286	66.140714	36.776429	4.399286	...
Norway	18.390000	18.860000	66.690000	36.340000	2.960000	...
Palestine	19.680000	22.470000	68.100000	38.340000	5.190000	...

Peru	12.648000	17.694000	64.694000	35.894000	2.342000	...
Poland	15.837500	17.127500	69.510000	37.850000	5.610000	...
Portugal	13.598333	19.120000	70.511667	39.573333	6.020000	...
Russian Federation	12.856000	18.190000	65.362000	35.560000	3.202000	...
Singapore	16.845000	19.620000	71.405000	37.830000	3.595000	...
Spain	14.534250	18.534500	68.586500	38.346250	3.595000	...
Sweden	13.571429	19.244286	65.941429	34.744286	3.494286	...
Switzerland	14.965385	18.973077	67.793846	37.250769	3.877692	...
Syria	14.580000	21.430000	72.860000	38.710000	3.290000	...
Thailand	15.767143	19.845714	67.105714	36.802857	4.047143	...
Turkey	13.855000	19.630000	65.350000	36.353333	3.866667	...
United Kingdom	13.719412	17.574118	68.757647	38.407647	4.081765	...
Vietnam	15.136667	19.066667	67.590000	37.188333	4.503333	...

	Comma	Colon	SemiC	QMark	Exclam	\
Country						
Afghanistan	7.600000	0.290000	0.140000	0.000000	0.000000	
Argentina	6.660000	0.700000	0.190000	0.000000	0.000000	
Armenia	6.210000	0.300000	0.050000	0.000000	0.000000	
Austria	5.333333	0.831667	0.085000	0.071667	0.000000	
Barbados	5.840000	0.290000	0.150000	0.000000	0.000000	
Belgium	5.490000	0.390000	0.255714	0.000000	0.000000	
Bermuda	4.840000	0.505000	0.235000	0.305000	0.000000	
Brazil	6.341111	0.320000	0.076667	0.032222	0.011111	
Bulgaria	5.460000	0.540000	0.090000	0.000000	0.000000	
Burma	6.540000	1.150000	0.210000	0.000000	0.050000	
Canada	4.960769	0.364615	0.065385	0.000000	0.000000	
China	5.492500	0.581406	0.168281	0.035469	0.002812	
Denmark	6.440000	0.605000	0.015000	0.132500	0.000000	
Egypt	5.274167	0.928333	0.063333	0.011667	0.000000	
Estonia	5.780000	0.330000	0.110000	0.110000	0.000000	
France	5.226800	0.526092	0.117200	0.035785	0.004154	
Georgia	5.560000	0.356667	0.086667	0.013333	0.016667	
Germany	4.552857	0.454286	0.184286	0.085714	0.000000	
Greece	5.346129	0.605161	0.123871	0.000000	0.000000	
Hungary	4.495000	0.487500	0.235000	0.000000	0.000000	
India	6.070800	0.469200	0.136800	0.014400	0.006000	
Indonesia	6.570000	0.375000	0.180000	0.000000	0.000000	
Ireland	5.504000	0.800000	0.210000	0.332000	0.000000	
Israel	6.350000	0.470000	0.050000	0.000000	0.000000	
Italy	5.460132	0.601667	0.125175	0.030044	0.004868	
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000	
Japan	5.297500	0.683214	0.130000	0.017500	0.004643	
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000	
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000	
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667	
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000	

Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000
Norway	5.640000	0.960000	0.210000	0.000000	0.000000
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000
Peru	5.628000	0.550000	0.026000	0.000000	0.000000
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000
France	1.153569	0.004892	1.444185	0.876677	1.249108
Georgia	0.943333	0.000000	1.450000	0.526667	2.063333
Germany	1.372857	0.004286	1.282857	0.301429	3.200000
Greece	1.011613	0.006452	0.725161	0.410968	1.102581
Hungary	0.982500	0.000000	0.560000	0.612500	2.255000
India	1.351600	0.000000	1.991200	0.691200	2.030400
Indonesia	1.430000	0.030000	0.665000	1.780000	1.580000
Ireland	1.330000	0.000000	3.254000	0.616000	1.206000
Israel	1.070000	0.000000	3.450000	0.930000	1.260000

```
Italy               1.134518  0.004561  1.355307  0.780746  1.277851
Jamaica             1.270000  0.000000  1.420000  1.720000  2.920000
Japan               1.207857  0.000000  1.271429  0.810000  1.641071
Jersey              0.841250  0.000000  1.142500  1.323750  3.186250
Latvia              1.500000  0.000000  5.760000  0.200000  2.710000
Lebanon             1.040000  0.000000  1.510000  0.690000  1.386667
Luxembourg          2.800000  0.000000  2.300000  0.630000  1.040000
Malaysia            1.375000  0.000000  1.440000  0.530000  4.075000
Martinique          1.410000  0.000000  0.300000  0.590000  6.080000
Mexico              1.539828  0.001552  1.297759  0.895690  1.517241
Morocco             0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands         1.603571  0.000000  2.865000  0.672857  1.208571
Norway              0.760000  0.000000  0.140000  2.060000  1.650000
Palestine           1.520000  0.000000  3.820000  0.840000  0.470000
Peru                1.168000  0.000000  0.572000  0.368000  0.656000
Poland              1.010000  0.000000  2.065000  0.880000  0.865000
Portugal            1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation  1.280000  0.000000  1.440000  1.126000  1.060000
Singapore           1.110000  0.000000  2.310000  0.235000  0.760000
Spain               1.196750  0.002000  1.062000  0.897000  1.733500
Sweden              1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland         1.075385  0.003846  1.330769  0.756923  1.960769
Syria               2.570000  0.000000  3.000000  0.860000  0.430000
Thailand            1.134286  0.000000  2.298571  1.081429  1.437143
Turkey              1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom      0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam             1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.2.2 Use groupby function to produce the mean value in each quantitative column for each continent

```
[69]: groupby_con_mean_df_2 = df1_liwc.groupby("Country").mean(numeric_only=True)
      groupby_con_mean_df_2 = groupby_con_mean_df_2.drop(groupby_con_mean_df_2.
      ↪index[0])
      groupby_con_mean_df_2 = groupby_con_mean_df_2.drop("Source (F)",axis=1)
      groupby_con_mean_df_2
```

```
[69]:                      WC    Analytic     Clout  Authentic       Tone  \
      Country
      Afghanistan  2078.000000  94.380000  58.740000  18.370000  29.800000
      Argentina    2567.000000  98.110000  52.030000  14.780000  27.710000
      Armenia      4330.000000  93.470000  43.940000  24.620000  31.270000
      Austria      1194.083333  95.870000  56.314167  14.162500  42.167500
      Barbados      685.000000  88.370000  36.290000  25.670000  15.500000
      Belgium       833.142857  97.494286  47.518571  20.001429  31.001429
```

Bermuda	541.000000	90.295000	48.145000	24.885000	23.545000
Brazil	1744.666667	95.586667	47.893333	18.612222	38.496667
Bulgaria	1118.000000	96.450000	42.540000	9.800000	35.120000
Burma	1912.000000	94.640000	63.310000	20.990000	24.930000
Canada	1059.692308	95.527692	48.241538	19.528462	41.510000
China	1402.625000	95.066641	48.824375	18.128047	35.558750
Denmark	947.500000	89.425000	54.180000	10.857500	34.347500
Egypt	1174.250000	97.278333	55.270833	23.430833	39.959167
Estonia	899.000000	97.170000	60.540000	25.940000	52.920000
France	1526.578462	96.130708	50.012646	17.612769	41.174892
Georgia	2040.666667	98.043333	51.456667	18.253333	34.220000
Germany	1404.285714	94.748571	53.110000	15.520000	32.054286
Greece	1025.709677	95.969677	45.147742	15.301613	40.556452
Hungary	1649.250000	96.645000	46.395000	14.622500	44.110000
India	1725.800000	94.903600	52.015600	17.686000	31.194000
Indonesia	1516.500000	95.740000	46.640000	7.640000	18.345000
Ireland	1994.000000	89.526000	56.042000	19.410000	43.746000
Israel	2143.000000	87.490000	51.870000	17.530000	30.500000
Italy	1384.706140	95.111140	49.084649	17.567368	39.806184
Jamaica	2673.000000	95.940000	51.050000	17.590000	28.260000
Japan	1699.535714	95.610357	50.469643	18.332143	43.664643
Jersey	1614.125000	95.925000	47.405000	18.570000	42.515000
Latvia	1996.000000	97.610000	59.700000	11.290000	26.600000
Lebanon	1979.333333	95.763333	59.640000	14.326667	62.370000
Luxembourg	2394.000000	97.740000	51.840000	21.620000	47.390000
Malaysia	1934.500000	94.100000	48.880000	14.080000	29.370000
Martinique	1348.000000	92.170000	42.640000	5.820000	21.220000
Mexico	1447.896552	95.712069	49.854483	17.680690	42.423793
Morocco	1166.954545	95.141818	49.725455	18.417273	41.380909
Netherlands	1650.142857	94.834286	54.525000	13.259286	41.741429
Norway	1453.000000	95.360000	48.900000	11.630000	22.570000
Palestine	1909.000000	95.720000	64.710000	12.660000	54.370000
Peru	978.000000	96.814000	48.882000	8.342000	27.174000
Poland	1450.750000	91.037500	45.872500	14.687500	42.110000
Portugal	1766.666667	91.348333	54.671667	17.136667	46.013333
Russian Federation	1465.200000	95.214000	49.008000	12.566000	43.070000
Singapore	1710.000000	95.510000	57.875000	14.825000	52.060000
Spain	1180.925000	95.416250	48.128000	19.387250	38.898750
Sweden	2310.142857	95.510000	48.870000	15.304286	42.837143
Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769
Syria	700.000000	97.730000	56.250000	27.590000	55.390000
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667

```
               WPS    Sixltr      Dic   function   pronoun  ...  \
```

Country						
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...
China	14.150937	19.131484	66.323203	36.076797	3.350234	...
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...
France	14.303323	18.144246	68.253969	38.043754	3.987077	...
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...
India	15.218800	18.877600	67.590000	36.448000	4.284800	...
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...
Lebanon	17.886667	19.320000	69.653333	38.993333	4.616667	...
Luxembourg	18.420000	15.080000	67.540000	37.760000	2.550000	...
Malaysia	11.365000	19.785000	65.610000	33.875000	2.765000	...
Martinique	15.860000	17.580000	61.200000	32.640000	2.970000	...
Mexico	14.475517	19.086724	66.820172	37.476552	4.035690	...
Morocco	15.092727	19.106364	67.562273	39.191364	4.010000	...
Netherlands	15.422143	19.239286	66.140714	36.776429	4.399286	...
Norway	18.390000	18.860000	66.690000	36.340000	2.960000	...
Palestine	19.680000	22.470000	68.100000	38.340000	5.190000	...
Peru	12.648000	17.694000	64.694000	35.894000	2.342000	...
Poland	15.837500	17.127500	69.510000	37.850000	5.610000	...
Portugal	13.598333	19.120000	70.511667	39.573333	6.020000	...
Russian Federation	12.856000	18.190000	65.362000	35.560000	3.202000	...
Singapore	16.845000	19.620000	71.405000	37.830000	3.595000	...
Spain	14.534250	18.534500	68.586500	38.346250	3.595000	...
Sweden	13.571429	19.244286	65.941429	34.744286	3.494286	...
Switzerland	14.965385	18.973077	67.793846	37.250769	3.877692	...

Syria	14.580000	21.430000	72.860000	38.710000	3.290000	...
Thailand	15.767143	19.845714	67.105714	36.802857	4.047143	...
Turkey	13.855000	19.630000	65.350000	36.353333	3.866667	...
United Kingdom	13.719412	17.574118	68.757647	38.407647	4.081765	...
Vietnam	15.136667	19.066667	67.590000	37.188333	4.503333	...

	Comma	Colon	SemiC	QMark	Exclam \
Country					
Afghanistan	7.600000	0.290000	0.140000	0.000000	0.000000
Argentina	6.660000	0.700000	0.190000	0.000000	0.000000
Armenia	6.210000	0.300000	0.050000	0.000000	0.000000
Austria	5.333333	0.831667	0.085000	0.071667	0.000000
Barbados	5.840000	0.290000	0.150000	0.000000	0.000000
Belgium	5.490000	0.390000	0.255714	0.000000	0.000000
Bermuda	4.840000	0.505000	0.235000	0.305000	0.000000
Brazil	6.341111	0.320000	0.076667	0.032222	0.011111
Bulgaria	5.460000	0.540000	0.090000	0.000000	0.000000
Burma	6.540000	1.150000	0.210000	0.000000	0.050000
Canada	4.960769	0.364615	0.065385	0.000000	0.000000
China	5.492500	0.581406	0.168281	0.035469	0.002812
Denmark	6.440000	0.605000	0.015000	0.132500	0.000000
Egypt	5.274167	0.928333	0.063333	0.011667	0.000000
Estonia	5.780000	0.330000	0.110000	0.110000	0.000000
France	5.226800	0.526092	0.117200	0.035785	0.004154
Georgia	5.560000	0.356667	0.086667	0.013333	0.016667
Germany	4.552857	0.454286	0.184286	0.085714	0.000000
Greece	5.346129	0.605161	0.123871	0.000000	0.000000
Hungary	4.495000	0.487500	0.235000	0.000000	0.000000
India	6.070800	0.469200	0.136800	0.014400	0.006000
Indonesia	6.570000	0.375000	0.180000	0.000000	0.000000
Ireland	5.504000	0.800000	0.210000	0.332000	0.000000
Israel	6.350000	0.470000	0.050000	0.000000	0.000000
Italy	5.460132	0.601667	0.125175	0.030044	0.004868
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000
Japan	5.297500	0.683214	0.130000	0.017500	0.004643
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000
Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000
Norway	5.640000	0.960000	0.210000	0.000000	0.000000
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000
Peru	5.628000	0.550000	0.026000	0.000000	0.000000

Country					
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000
France	1.153569	0.004892	1.444185	0.876677	1.249108
Georgia	0.943333	0.000000	1.450000	0.526667	2.063333
Germany	1.372857	0.004286	1.282857	0.301429	3.200000
Greece	1.011613	0.006452	0.725161	0.410968	1.102581
Hungary	0.982500	0.000000	0.560000	0.612500	2.255000
India	1.351600	0.000000	1.991200	0.691200	2.030400
Indonesia	1.430000	0.030000	0.665000	1.780000	1.580000
Ireland	1.330000	0.000000	3.254000	0.616000	1.206000
Israel	1.070000	0.000000	3.450000	0.930000	1.260000
Italy	1.134518	0.004561	1.355307	0.780746	1.277851
Jamaica	1.270000	0.000000	1.420000	1.720000	2.920000
Japan	1.207857	0.000000	1.271429	0.810000	1.641071
Jersey	0.841250	0.000000	1.142500	1.323750	3.186250
Latvia	1.500000	0.000000	5.760000	0.200000	2.710000
Lebanon	1.040000	0.000000	1.510000	0.690000	1.386667
Luxembourg	2.800000	0.000000	2.300000	0.630000	1.040000
Malaysia	1.375000	0.000000	1.440000	0.530000	4.075000

```
Martinique          1.410000  0.000000  0.300000  0.590000  6.080000
Mexico              1.539828  0.001552  1.297759  0.895690  1.517241
Morocco             0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands         1.603571  0.000000  2.865000  0.672857  1.208571
Norway              0.760000  0.000000  0.140000  2.060000  1.650000
Palestine           1.520000  0.000000  3.820000  0.840000  0.470000
Peru                1.168000  0.000000  0.572000  0.368000  0.656000
Poland              1.010000  0.000000  2.065000  0.880000  0.865000
Portugal            1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation  1.280000  0.000000  1.440000  1.126000  1.060000
Singapore           1.110000  0.000000  2.310000  0.235000  0.760000
Spain               1.196750  0.002000  1.062000  0.897000  1.733500
Sweden              1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland         1.075385  0.003846  1.330769  0.756923  1.960769
Syria               2.570000  0.000000  3.000000  0.860000  0.430000
Thailand            1.134286  0.000000  2.298571  1.081429  1.437143
Turkey              1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom      0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam             1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.2.3 Show only the columns of "Affective processes" and its sub-codes

```
[70]: groupby_coun_mean_df_2[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]
```

```
[70]:                 affect    posemo    negemo       anx     anger       sad
       Country
       Afghanistan   2.940000  1.590000  1.350000  0.000000  0.430000  0.140000
       Argentina     1.600000  0.860000  0.740000  0.040000  0.350000  0.040000
       Armenia       3.280000  1.800000  1.480000  0.050000  0.760000  0.180000
       Austria       2.810833  1.855833  0.956667  0.012500  0.585000  0.274167
       Barbados      2.920000  1.020000  1.750000  0.290000  0.440000  0.000000
       Belgium       2.187143  1.200000  0.984286  0.230000  0.405714  0.057143
       Bermuda       2.775000  1.305000  1.470000  0.150000  0.230000  0.120000
       Brazil        2.767778  1.716667  1.013333  0.087778  0.233333  0.237778
       Bulgaria      1.610000  1.070000  0.540000  0.090000  0.090000  0.090000
       Burma         2.040000  0.990000  1.050000  0.050000  0.680000  0.260000
       Canada        2.911538  1.883077  1.023077  0.181538  0.341538  0.160769
       China         2.635078  1.560156  1.043281  0.049766  0.481250  0.196094
       Denmark       3.295000  1.862500  1.370000  0.140000  0.402500  0.297500
       Egypt         2.270000  1.510000  0.730833  0.065833  0.330000  0.044167
       Estonia       2.780000  2.110000  0.670000  0.000000  0.440000  0.000000
       France        2.739415  1.757415  0.928062  0.086862  0.365077  0.143200
       Georgia       2.493333  1.416667  0.966667  0.090000  0.393333  0.043333
       Germany       2.295714  1.312857  0.982857  0.092857  0.534286  0.195714
       Greece        2.128387  1.460323  0.653871  0.069355  0.220323  0.173226
```

```
Hungary              2.382500   1.687500   0.695000   0.055000   0.220000   0.075000
India                2.718000   1.474000   1.182400   0.052000   0.644000   0.184800
Indonesia            3.265000   1.345000   1.925000   0.030000   1.015000   0.075000
Ireland              3.080000   2.024000   1.044000   0.100000   0.448000   0.148000
Israel               2.150000   1.210000   0.930000   0.090000   0.470000   0.190000
Italy                2.634868   1.678465   0.923816   0.087325   0.358465   0.176316
Jamaica              2.580000   1.350000   1.200000   0.070000   0.670000   0.150000
Japan                2.291071   1.596071   0.636786   0.069286   0.279643   0.110357
Jersey               2.957500   1.933750   1.016250   0.042500   0.577500   0.257500
Latvia               2.350000   1.200000   1.150000   0.000000   0.350000   0.200000
Lebanon              3.223333   2.590000   0.616667   0.156667   0.173333   0.073333
Luxembourg           2.420000   1.800000   0.630000   0.000000   0.290000   0.080000
Malaysia             2.945000   1.515000   1.335000   0.210000   0.525000   0.060000
Martinique           2.970000   1.340000   1.630000   0.150000   0.890000   0.070000
Mexico               2.617414   1.745690   0.846034   0.087069   0.329655   0.134828
Morocco              2.416364   1.610000   0.776818   0.010909   0.361818   0.148636
Netherlands          2.738571   1.794286   0.925714   0.058571   0.427143   0.155000
Norway               3.230000   1.510000   1.720000   0.000000   0.690000   0.140000
Palestine            3.090000   2.300000   0.790000   0.050000   0.370000   0.050000
Peru                 2.462000   1.260000   1.194000   0.026000   0.480000   0.158000
Poland               2.607500   1.732500   0.840000   0.060000   0.370000   0.150000
Portugal             3.133333   2.103333   1.015000   0.030000   0.345000   0.286667
Russian Federation   2.674000   1.790000   0.846000   0.036000   0.298000   0.108000
Singapore            3.565000   2.485000   1.085000   0.000000   0.615000   0.060000
Spain                2.604250   1.636500   0.931000   0.099750   0.406000   0.163000
Sweden               2.962857   1.934286   1.000000   0.190000   0.384286   0.140000
Switzerland          3.032308   1.784615   1.144615   0.147692   0.468462   0.145385
Syria                3.570000   2.570000   1.000000   0.140000   0.290000   0.290000
Thailand             2.557143   1.511429   0.922857   0.057143   0.372857   0.048571
Turkey               2.328333   1.535000   0.793333   0.130000   0.420000   0.125000
United Kingdom       3.079412   1.823529   1.206471   0.077647   0.408824   0.241765
Vietnam              2.860000   1.853333   0.926667   0.068333   0.368333   0.120000
```

[71]: `groupby_con_mean_df_2[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]`

[71]:
```
                       affect     posemo     negemo        anx      anger        sad
Country
Afghanistan          2.940000   1.590000   1.350000   0.000000   0.430000   0.140000
Argentina            1.600000   0.860000   0.740000   0.040000   0.350000   0.040000
Armenia              3.280000   1.800000   1.480000   0.050000   0.760000   0.180000
Austria              2.810833   1.855833   0.956667   0.012500   0.585000   0.274167
Barbados             2.920000   1.020000   1.750000   0.290000   0.440000   0.000000
Belgium              2.187143   1.200000   0.984286   0.230000   0.405714   0.057143
Bermuda              2.775000   1.305000   1.470000   0.150000   0.230000   0.120000
Brazil               2.767778   1.716667   1.013333   0.087778   0.233333   0.237778
Bulgaria             1.610000   1.070000   0.540000   0.090000   0.090000   0.090000
Burma                2.040000   0.990000   1.050000   0.050000   0.680000   0.260000
```

Canada	2.911538	1.883077	1.023077	0.181538	0.341538	0.160769
China	2.635078	1.560156	1.043281	0.049766	0.481250	0.196094
Denmark	3.295000	1.862500	1.370000	0.140000	0.402500	0.297500
Egypt	2.270000	1.510000	0.730833	0.065833	0.330000	0.044167
Estonia	2.780000	2.110000	0.670000	0.000000	0.440000	0.000000
France	2.739415	1.757415	0.928062	0.086862	0.365077	0.143200
Georgia	2.493333	1.416667	0.966667	0.090000	0.393333	0.043333
Germany	2.295714	1.312857	0.982857	0.092857	0.534286	0.195714
Greece	2.128387	1.460323	0.653871	0.069355	0.220323	0.173226
Hungary	2.382500	1.687500	0.695000	0.055000	0.220000	0.075000
India	2.718000	1.474000	1.182400	0.052000	0.644000	0.184800
Indonesia	3.265000	1.345000	1.925000	0.030000	1.015000	0.075000
Ireland	3.080000	2.024000	1.044000	0.100000	0.448000	0.148000
Israel	2.150000	1.210000	0.930000	0.090000	0.470000	0.190000
Italy	2.634868	1.678465	0.923816	0.087325	0.358465	0.176316
Jamaica	2.580000	1.350000	1.200000	0.070000	0.670000	0.150000
Japan	2.291071	1.596071	0.636786	0.069286	0.279643	0.110357
Jersey	2.957500	1.933750	1.016250	0.042500	0.577500	0.257500
Latvia	2.350000	1.200000	1.150000	0.000000	0.350000	0.200000
Lebanon	3.223333	2.590000	0.616667	0.156667	0.173333	0.073333
Luxembourg	2.420000	1.800000	0.630000	0.000000	0.290000	0.080000
Malaysia	2.945000	1.515000	1.335000	0.210000	0.525000	0.060000
Martinique	2.970000	1.340000	1.630000	0.150000	0.890000	0.070000
Mexico	2.617414	1.745690	0.846034	0.087069	0.329655	0.134828
Morocco	2.416364	1.610000	0.776818	0.010909	0.361818	0.148636
Netherlands	2.738571	1.794286	0.925714	0.058571	0.427143	0.155000
Norway	3.230000	1.510000	1.720000	0.000000	0.690000	0.140000
Palestine	3.090000	2.300000	0.790000	0.050000	0.370000	0.050000
Peru	2.462000	1.260000	1.194000	0.026000	0.480000	0.158000
Poland	2.607500	1.732500	0.840000	0.060000	0.370000	0.150000
Portugal	3.133333	2.103333	1.015000	0.030000	0.345000	0.286667
Russian Federation	2.674000	1.790000	0.846000	0.036000	0.298000	0.108000
Singapore	3.565000	2.485000	1.085000	0.000000	0.615000	0.060000
Spain	2.604250	1.636500	0.931000	0.099750	0.406000	0.163000
Sweden	2.962857	1.934286	1.000000	0.190000	0.384286	0.140000
Switzerland	3.032308	1.784615	1.144615	0.147692	0.468462	0.145385
Syria	3.570000	2.570000	1.000000	0.140000	0.290000	0.290000
Thailand	2.557143	1.511429	0.922857	0.057143	0.372857	0.048571
Turkey	2.328333	1.535000	0.793333	0.130000	0.420000	0.125000
United Kingdom	3.079412	1.823529	1.206471	0.077647	0.408824	0.241765
Vietnam	2.860000	1.853333	0.926667	0.068333	0.368333	0.120000

4.2.4 Compare negative emotions for each country

```
[72]: plt.rcParams["figure.figsize"] = (5,12)
      groupby_coun_mean_df_2[['anx','anger','sad']].plot.barh()
```

```
[72]: <Axes: ylabel='Country'>
```
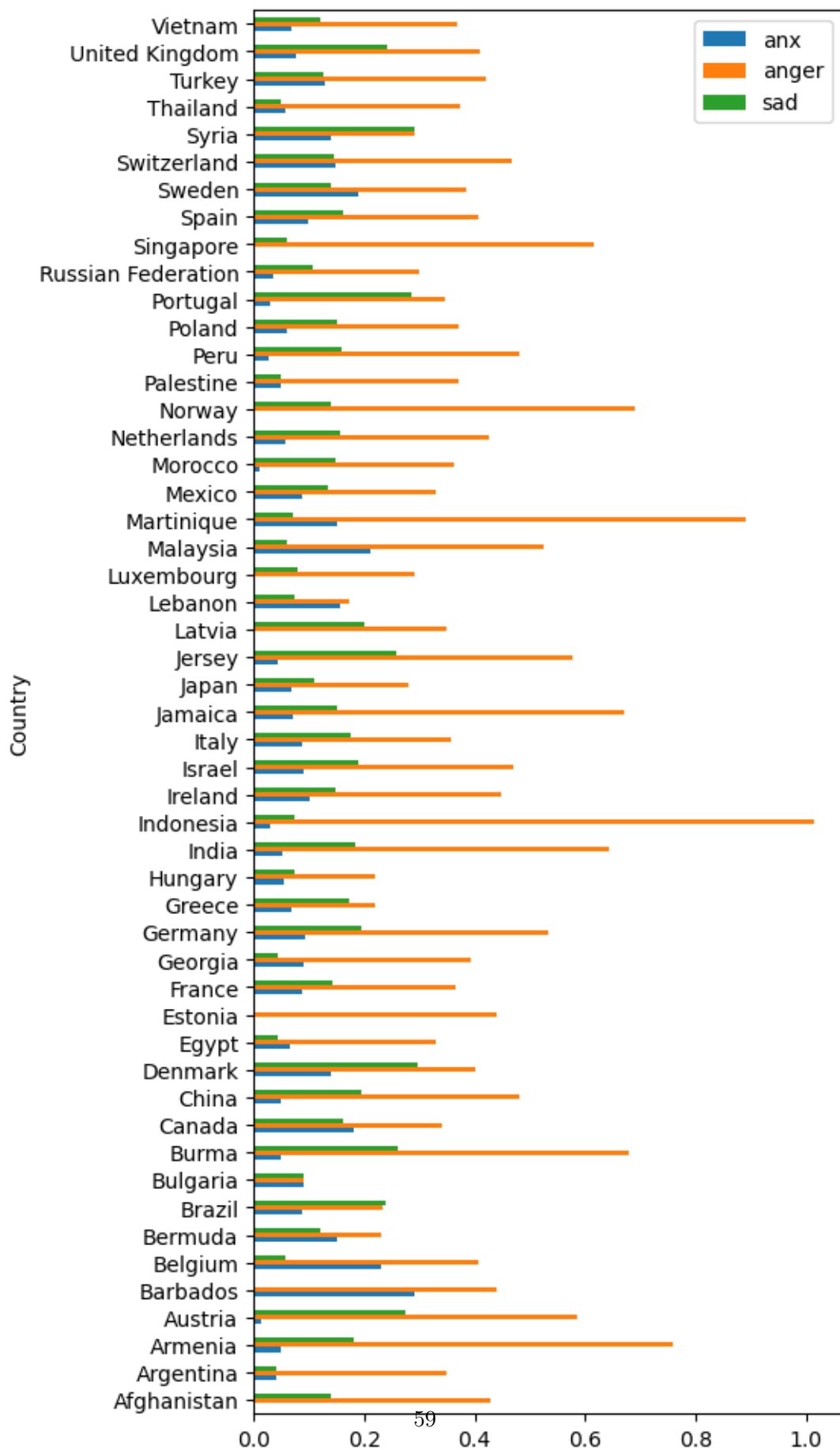
4.2.5   Compare negative emotions for each continent

```
[73]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_2[['anx','anger','sad']].plot.barh()
```

```
[73]: <Axes: ylabel='Country'>
```


4.2.6   Compare positive end negative emotions in each country

```
[74]: plt.rcParams["figure.figsize"] = (5,13)
      groupby_coun_mean_df_2[['negemo','posemo']].plot.barh()
```
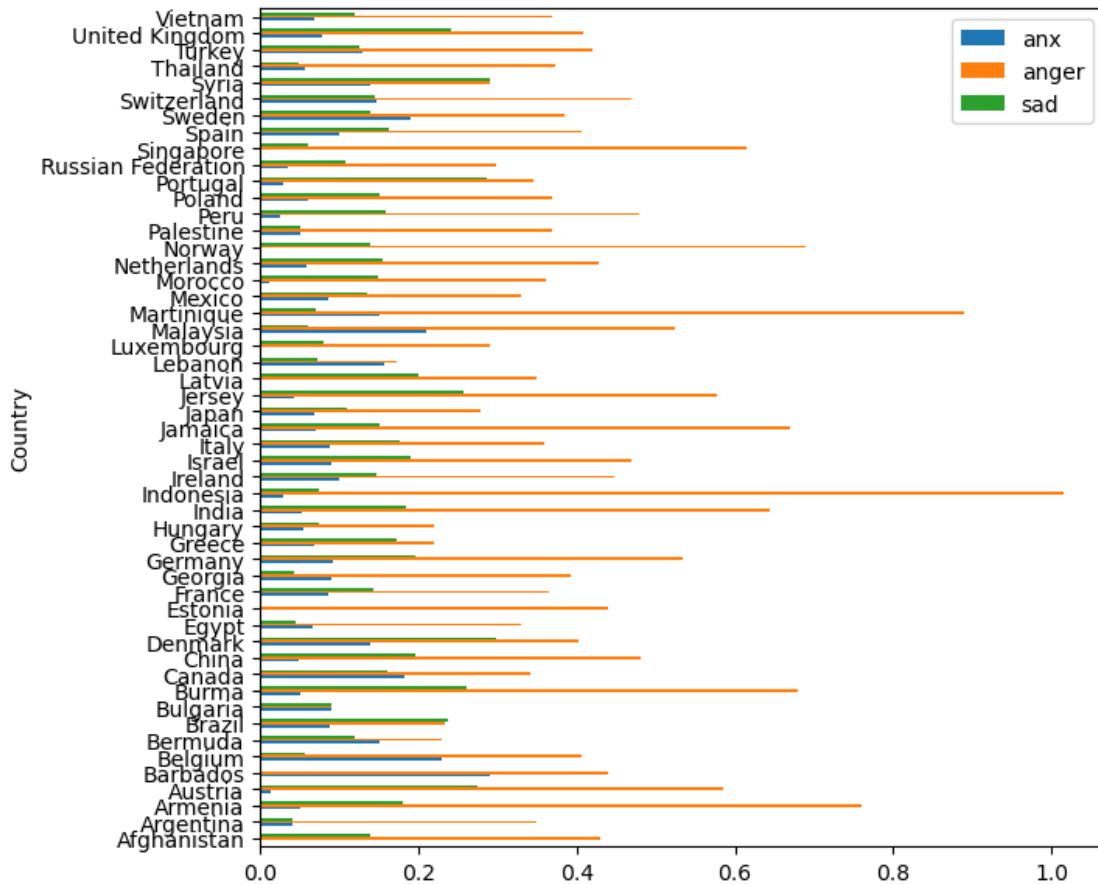
```
[74]: <Axes: ylabel='Country'>
```
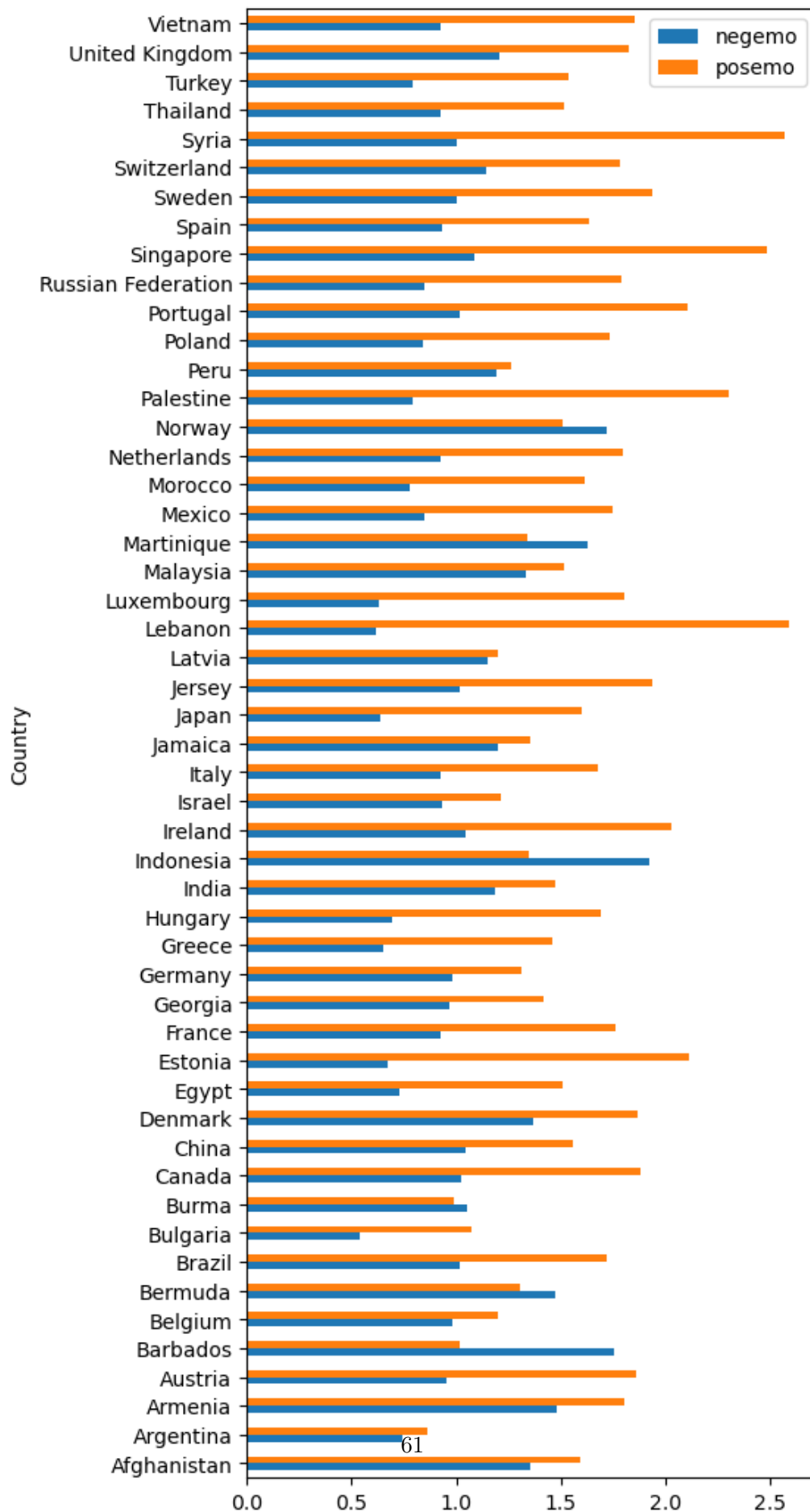
4.2.7 Compare positive end negative emotions in each continent

```
[75]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_2[['negemo','posemo']].plot.barh()
```

```
[75]: <Axes: ylabel='Country'>
```
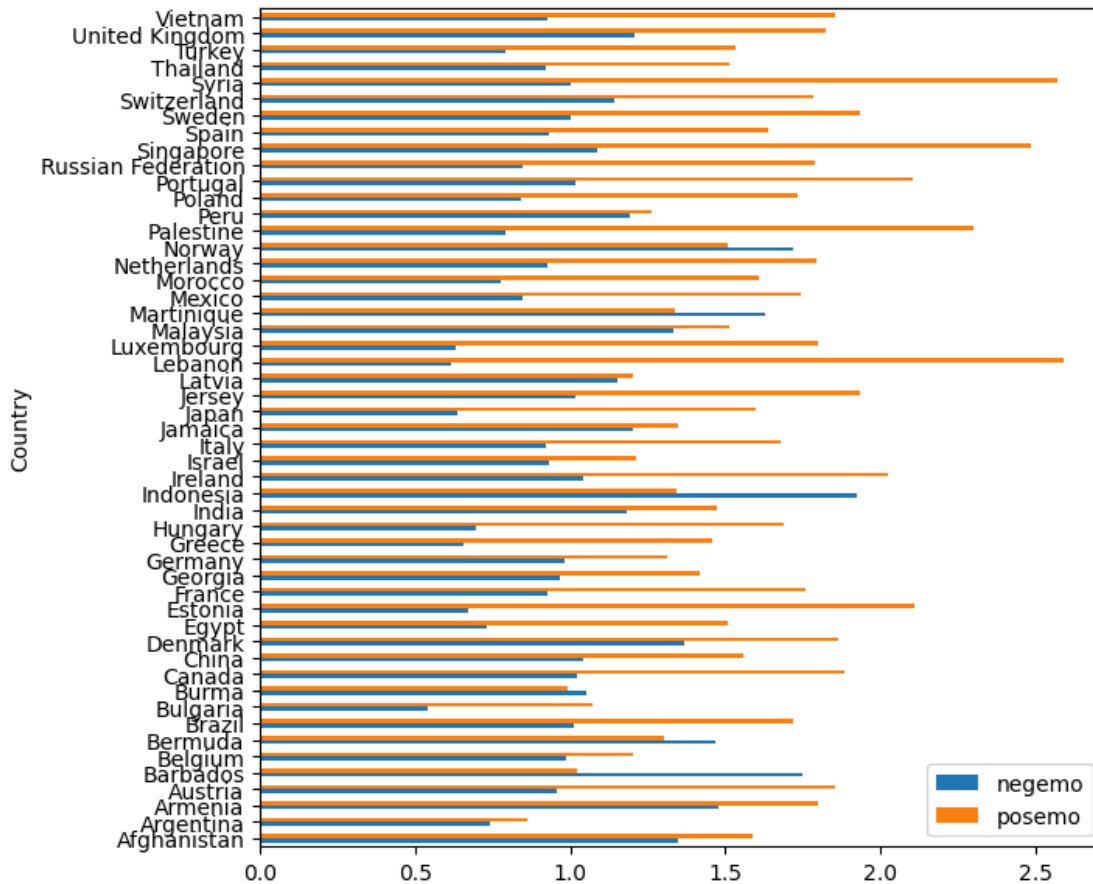

4.3 Era 3: 2000 - 2009

```
[76]: df3_liwc = pd.read_csv('./era3_LIWC2015.csv')
      df3_liwc = df3_liwc.drop("Source (A)",axis=1)

      df3_liwc.insert(1,"Country","")
      df3_liwc.insert(1,"Continent","")
      df3_liwc["Country"] = df_3["Country"]
      df3_liwc["Continent"] = df_3["Continent"]
```

```
df3_liwc = df3_liwc[df3_liwc['Country'] != "United States of America"]

df3_liwc
```

[76]:
```
                                              Source (B)  Continent  \
0    Headnote A well-prepared meal might be the way...    Europe
1    THERE are two ways to give a dinner party and ...    Europe
2    Headnote A rare instance in which fat is your ...    Europe
3    Headnote How I Learned to Stop Worrying... Hea...  Americas
6    WHILE French restaurant and country cooking ha...    Europe
..                                                 ...       ...
993  Want to make some extra dough on weekends? Piz...    Europe
994  PAUL LIEBRANDT wants the world to know that he...    Europe
995  MICHAEL RUHLMAN says his new book, "Ratio: The...    Europe
996  WHEN you've gained enough experience cooking, ...    Europe
997  AS if a menu with lamb's tongue, calf's heart,...    Europe

            Country                               Source (C)  \
0             Spain                    Cooking; Recipes; Food
1             Italy                                       NaN
2       Netherlands                   Recipes; Meat; Cooking
3            Brazil      Social life & customs; Cooking; Recipes
6            France                         Cooking; Recipes
..              ...                                      ...
993         Albania                 Pizza; Cooking; Recipes
994  United Kingdom                              Restaurants
995          France  Cooking; Recipes; Cookbooks; Books -- Ratio
996           Italy          Vegetables; Recipes; Cooking; Soups
997  United Kingdom             Restaurants -- Feast-Houston TX

                                    Source (D)  \
0                           A taste for seduction
1      Give the Guests a Chef's Apron and Let the Coo...
2                                    Lvoe me tender
3      How I learned to stop worrying...and entertain...
6         Born in a French Cafe, Growing Up in New York
..                                            ...
993                                    Crust Fund
994                              At Home, at Last
995             Everyday Cooking Is as Easy as 3:2:1
996               A Soup Only a Tuscan Could Think Up
997           British Derring-Do, Innards a Specialty

                                    Source (E)  Source (F)  \
0                New York Times Magazine; New York       2000.0
1      New York Times, Late Edition (East Coast); New...    2000.0
2                New York Times Magazine; New York       2000.0
```

```
3                   New York Times Magazine; New York        2000.0
6      New York Times, Late Edition (East Coast); New...        2000.0
..                                               ...            ...
993                 New York Times Magazine; New York        2009.0
994    New York Times, Late Edition (East Coast); New...        2009.0
995    New York Times, Late Edition (East Coast); New...        2009.0
996    New York Times, Late Edition (East Coast); New...        2009.0
997    New York Times, Late Edition (East Coast); New...        2009.0

          Source (G)    WC  Analytic  ...  Comma  Colon  SemiC  QMark  Exclam  \
0          New York   1738     87.93  ...   6.73   0.63   0.12   0.00    0.00
1    New York, N.Y.   1690     95.15  ...   5.15   1.18   0.00   0.00    0.00
2          New York   1699     98.39  ...   7.42   0.29   0.00   0.00    0.00
3          New York   2214     81.06  ...   5.69   0.41   0.45   0.27    0.05
6    New York, N.Y.   2390     94.11  ...   6.40   0.67   0.59   0.08    0.04
..              ...    ...       ...  ...    ...    ...    ...    ...     ...
993        New York   1413     93.83  ...   6.23   0.42   0.07   0.35    0.07
994  New York, N.Y.   2157     92.49  ...   7.97   0.93   0.60   0.09    0.00
995  New York, N.Y.   1815     94.40  ...   5.01   2.98   0.39   0.06    0.00
996  New York, N.Y.    659     81.31  ...   8.50   0.91   0.30   0.00    0.00
997  New York, N.Y.   2892     90.03  ...   6.98   0.93   0.35   0.07    0.00

     Dash  Quote  Apostro  Parenth  OtherP
0    1.15   0.12     1.55     1.04    0.81
1    1.60   0.00     0.71     0.59    0.83
2    2.30   0.35     0.35     0.82    0.94
3    0.86   0.27     2.53     1.17    0.54
6    2.26   0.00     1.97     0.92    0.42
..    ...    ...      ...      ...     ...
993  1.34   0.57     1.49     0.42    0.14
994  1.67   3.25     1.21     1.76    0.37
995  2.64   3.86     0.77     3.97    0.72
996  2.12   0.30     0.61     1.82    2.43
997  2.04   1.38     2.18     1.31    0.73

[900 rows x 101 columns]
```

4.3.1 Use groupby function to produce the mean value in each quantitative column for each country

```
[77]: groupby_coun_mean_df_3 = df1_liwc.groupby("Country").mean(numeric_only=True)
      groupby_coun_mean_df_3 = groupby_coun_mean_df_3.drop(groupby_coun_mean_df_3.
       ↪index[0])
      groupby_coun_mean_df_3 = groupby_coun_mean_df_3.drop("Source (F)",axis=1)
      groupby_coun_mean_df_3
```

```
[77]:                        WC    Analytic      Clout  Authentic        Tone  \
    Country
    Afghanistan         2078.000000   94.380000   58.740000   18.370000   29.800000
    Argentina           2567.000000   98.110000   52.030000   14.780000   27.710000
    Armenia             4330.000000   93.470000   43.940000   24.620000   31.270000
    Austria             1194.083333   95.870000   56.314167   14.162500   42.167500
    Barbados             685.000000   88.370000   36.290000   25.670000   15.500000
    Belgium              833.142857   97.494286   47.518571   20.001429   31.001429
    Bermuda              541.000000   90.295000   48.145000   24.885000   23.545000
    Brazil              1744.666667   95.586667   47.893333   18.612222   38.496667
    Bulgaria            1118.000000   96.450000   42.540000    9.800000   35.120000
    Burma               1912.000000   94.640000   63.310000   20.990000   24.930000
    Canada              1059.692308   95.527692   48.241538   19.528462   41.510000
    China               1402.625000   95.066641   48.824375   18.128047   35.558750
    Denmark              947.500000   89.425000   54.180000   10.857500   34.347500
    Egypt               1174.250000   97.278333   55.270833   23.430833   39.959167
    Estonia              899.000000   97.170000   60.540000   25.940000   52.920000
    France              1526.578462   96.130708   50.012646   17.612769   41.174892
    Georgia             2040.666667   98.043333   51.456667   18.253333   34.220000
    Germany             1404.285714   94.748571   53.110000   15.520000   32.054286
    Greece              1025.709677   95.969677   45.147742   15.301613   40.556452
    Hungary             1649.250000   96.645000   46.395000   14.622500   44.110000
    India               1725.800000   94.903600   52.015600   17.686000   31.194000
    Indonesia           1516.500000   95.740000   46.640000    7.640000   18.345000
    Ireland             1994.000000   89.526000   56.042000   19.410000   43.746000
    Israel              2143.000000   87.490000   51.870000   17.530000   30.500000
    Italy               1384.706140   95.111140   49.084649   17.567368   39.806184
    Jamaica             2673.000000   95.940000   51.050000   17.590000   28.260000
    Japan               1699.535714   95.610357   50.469643   18.332143   43.664643
    Jersey              1614.125000   95.925000   47.405000   18.570000   42.515000
    Latvia              1996.000000   97.610000   59.700000   11.290000   26.600000
    Lebanon             1979.333333   95.763333   59.640000   14.326667   62.370000
    Luxembourg          2394.000000   97.740000   51.840000   21.620000   47.390000
    Malaysia            1934.500000   94.100000   48.880000   14.080000   29.370000
    Martinique          1348.000000   92.170000   42.640000    5.820000   21.220000
    Mexico              1447.896552   95.712069   49.854483   17.680690   42.423793
    Morocco             1166.954545   95.141818   49.725455   18.417273   41.380909
    Netherlands         1650.142857   94.834286   54.525000   13.259286   41.741429
    Norway              1453.000000   95.360000   48.900000   11.630000   22.570000
    Palestine           1909.000000   95.720000   64.710000   12.660000   54.370000
    Peru                 978.000000   96.814000   48.882000    8.342000   27.174000
    Poland              1450.750000   91.037500   45.872500   14.687500   42.110000
    Portugal            1766.666667   91.348333   54.671667   17.136667   46.013333
    Russian Federation  1465.200000   95.214000   49.008000   12.566000   43.070000
    Singapore           1710.000000   95.510000   57.875000   14.825000   52.060000
    Spain               1180.925000   95.416250   48.128000   19.387250   38.898750
    Sweden              2310.142857   95.510000   48.870000   15.304286   42.837143
```

Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769
Syria	700.000000	97.730000	56.250000	27.590000	55.390000
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667

	WPS	Sixltr	Dic	function	pronoun	...	\
Country						...	
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...	
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...	
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...	
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...	
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...	
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...	
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...	
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...	
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...	
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...	
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...	
China	14.150937	19.131484	66.323203	36.076797	3.350234	...	
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...	
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...	
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...	
France	14.303323	18.144246	68.253969	38.043754	3.987077	...	
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...	
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...	
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...	
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...	
India	15.218800	18.877600	67.590000	36.448000	4.284800	...	
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...	
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...	
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...	
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...	
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...	
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...	
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...	
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...	
Lebanon	17.886667	19.320000	69.653333	38.993333	4.616667	...	
Luxembourg	18.420000	15.080000	67.540000	37.760000	2.550000	...	
Malaysia	11.365000	19.785000	65.610000	33.875000	2.765000	...	
Martinique	15.860000	17.580000	61.200000	32.640000	2.970000	...	
Mexico	14.475517	19.086724	66.820172	37.476552	4.035690	...	
Morocco	15.092727	19.106364	67.562273	39.191364	4.010000	...	
Netherlands	15.422143	19.239286	66.140714	36.776429	4.399286	...	
Norway	18.390000	18.860000	66.690000	36.340000	2.960000	...	
Palestine	19.680000	22.470000	68.100000	38.340000	5.190000	...	

Peru	12.648000	17.694000	64.694000	35.894000	2.342000	...
Poland	15.837500	17.127500	69.510000	37.850000	5.610000	...
Portugal	13.598333	19.120000	70.511667	39.573333	6.020000	...
Russian Federation	12.856000	18.190000	65.362000	35.560000	3.202000	...
Singapore	16.845000	19.620000	71.405000	37.830000	3.595000	...
Spain	14.534250	18.534500	68.586500	38.346250	3.595000	...
Sweden	13.571429	19.244286	65.941429	34.744286	3.494286	...
Switzerland	14.965385	18.973077	67.793846	37.250769	3.877692	...
Syria	14.580000	21.430000	72.860000	38.710000	3.290000	...
Thailand	15.767143	19.845714	67.105714	36.802857	4.047143	...
Turkey	13.855000	19.630000	65.350000	36.353333	3.866667	...
United Kingdom	13.719412	17.574118	68.757647	38.407647	4.081765	...
Vietnam	15.136667	19.066667	67.590000	37.188333	4.503333	...

	Comma	Colon	SemiC	QMark	Exclam	\
Country						
Afghanistan	7.600000	0.290000	0.140000	0.000000	0.000000	
Argentina	6.660000	0.700000	0.190000	0.000000	0.000000	
Armenia	6.210000	0.300000	0.050000	0.000000	0.000000	
Austria	5.333333	0.831667	0.085000	0.071667	0.000000	
Barbados	5.840000	0.290000	0.150000	0.000000	0.000000	
Belgium	5.490000	0.390000	0.255714	0.000000	0.000000	
Bermuda	4.840000	0.505000	0.235000	0.305000	0.000000	
Brazil	6.341111	0.320000	0.076667	0.032222	0.011111	
Bulgaria	5.460000	0.540000	0.090000	0.000000	0.000000	
Burma	6.540000	1.150000	0.210000	0.000000	0.050000	
Canada	4.960769	0.364615	0.065385	0.000000	0.000000	
China	5.492500	0.581406	0.168281	0.035469	0.002812	
Denmark	6.440000	0.605000	0.015000	0.132500	0.000000	
Egypt	5.274167	0.928333	0.063333	0.011667	0.000000	
Estonia	5.780000	0.330000	0.110000	0.110000	0.000000	
France	5.226800	0.526092	0.117200	0.035785	0.004154	
Georgia	5.560000	0.356667	0.086667	0.013333	0.016667	
Germany	4.552857	0.454286	0.184286	0.085714	0.000000	
Greece	5.346129	0.605161	0.123871	0.000000	0.000000	
Hungary	4.495000	0.487500	0.235000	0.000000	0.000000	
India	6.070800	0.469200	0.136800	0.014400	0.006000	
Indonesia	6.570000	0.375000	0.180000	0.000000	0.000000	
Ireland	5.504000	0.800000	0.210000	0.332000	0.000000	
Israel	6.350000	0.470000	0.050000	0.000000	0.000000	
Italy	5.460132	0.601667	0.125175	0.030044	0.004868	
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000	
Japan	5.297500	0.683214	0.130000	0.017500	0.004643	
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000	
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000	
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667	
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000	

Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000
Norway	5.640000	0.960000	0.210000	0.000000	0.000000
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000
Peru	5.628000	0.550000	0.026000	0.000000	0.000000
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000
France	1.153569	0.004892	1.444185	0.876677	1.249108
Georgia	0.943333	0.000000	1.450000	0.526667	2.063333
Germany	1.372857	0.004286	1.282857	0.301429	3.200000
Greece	1.011613	0.006452	0.725161	0.410968	1.102581
Hungary	0.982500	0.000000	0.560000	0.612500	2.255000
India	1.351600	0.000000	1.991200	0.691200	2.030400
Indonesia	1.430000	0.030000	0.665000	1.780000	1.580000
Ireland	1.330000	0.000000	3.254000	0.616000	1.206000
Israel	1.070000	0.000000	3.450000	0.930000	1.260000

```
Italy                  1.134518  0.004561  1.355307  0.780746  1.277851
Jamaica                1.270000  0.000000  1.420000  1.720000  2.920000
Japan                  1.207857  0.000000  1.271429  0.810000  1.641071
Jersey                 0.841250  0.000000  1.142500  1.323750  3.186250
Latvia                 1.500000  0.000000  5.760000  0.200000  2.710000
Lebanon                1.040000  0.000000  1.510000  0.690000  1.386667
Luxembourg             2.800000  0.000000  2.300000  0.630000  1.040000
Malaysia               1.375000  0.000000  1.440000  0.530000  4.075000
Martinique             1.410000  0.000000  0.300000  0.590000  6.080000
Mexico                 1.539828  0.001552  1.297759  0.895690  1.517241
Morocco                0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands            1.603571  0.000000  2.865000  0.672857  1.208571
Norway                 0.760000  0.000000  0.140000  2.060000  1.650000
Palestine              1.520000  0.000000  3.820000  0.840000  0.470000
Peru                   1.168000  0.000000  0.572000  0.368000  0.656000
Poland                 1.010000  0.000000  2.065000  0.880000  0.865000
Portugal               1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation     1.280000  0.000000  1.440000  1.126000  1.060000
Singapore              1.110000  0.000000  2.310000  0.235000  0.760000
Spain                  1.196750  0.002000  1.062000  0.897000  1.733500
Sweden                 1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland            1.075385  0.003846  1.330769  0.756923  1.960769
Syria                  2.570000  0.000000  3.000000  0.860000  0.430000
Thailand               1.134286  0.000000  2.298571  1.081429  1.437143
Turkey                 1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom         0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam                1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.3.2 Use groupby function to produce the mean value in each quantitative column for each continent

```python
[78]: groupby_con_mean_df_3 = df1_liwc.groupby("Country").mean(numeric_only=True)
      groupby_con_mean_df_3 = groupby_con_mean_df_3.drop(groupby_con_mean_df_3.
       ↪index[0])
      groupby_con_mean_df_3 = groupby_con_mean_df_3.drop("Source (F)",axis=1)
      groupby_con_mean_df_3
```

```
[78]:                     WC     Analytic     Clout  Authentic      Tone  \
      Country
      Afghanistan   2078.000000  94.380000  58.740000  18.370000  29.800000
      Argentina     2567.000000  98.110000  52.030000  14.780000  27.710000
      Armenia       4330.000000  93.470000  43.940000  24.620000  31.270000
      Austria       1194.083333  95.870000  56.314167  14.162500  42.167500
      Barbados       685.000000  88.370000  36.290000  25.670000  15.500000
      Belgium        833.142857  97.494286  47.518571  20.001429  31.001429
```

69

	WPS	Sixltr	Dic	function	pronoun	...
Bermuda	541.000000	90.295000	48.145000	24.885000	23.545000	
Brazil	1744.666667	95.586667	47.893333	18.612222	38.496667	
Bulgaria	1118.000000	96.450000	42.540000	9.800000	35.120000	
Burma	1912.000000	94.640000	63.310000	20.990000	24.930000	
Canada	1059.692308	95.527692	48.241538	19.528462	41.510000	
China	1402.625000	95.066641	48.824375	18.128047	35.558750	
Denmark	947.500000	89.425000	54.180000	10.857500	34.347500	
Egypt	1174.250000	97.278333	55.270833	23.430833	39.959167	
Estonia	899.000000	97.170000	60.540000	25.940000	52.920000	
France	1526.578462	96.130708	50.012646	17.612769	41.174892	
Georgia	2040.666667	98.043333	51.456667	18.253333	34.220000	
Germany	1404.285714	94.748571	53.110000	15.520000	32.054286	
Greece	1025.709677	95.969677	45.147742	15.301613	40.556452	
Hungary	1649.250000	96.645000	46.395000	14.622500	44.110000	
India	1725.800000	94.903600	52.015600	17.686000	31.194000	
Indonesia	1516.500000	95.740000	46.640000	7.640000	18.345000	
Ireland	1994.000000	89.526000	56.042000	19.410000	43.746000	
Israel	2143.000000	87.490000	51.870000	17.530000	30.500000	
Italy	1384.706140	95.111140	49.084649	17.567368	39.806184	
Jamaica	2673.000000	95.940000	51.050000	17.590000	28.260000	
Japan	1699.535714	95.610357	50.469643	18.332143	43.664643	
Jersey	1614.125000	95.925000	47.405000	18.570000	42.515000	
Latvia	1996.000000	97.610000	59.700000	11.290000	26.600000	
Lebanon	1979.333333	95.763333	59.640000	14.326667	62.370000	
Luxembourg	2394.000000	97.740000	51.840000	21.620000	47.390000	
Malaysia	1934.500000	94.100000	48.880000	14.080000	29.370000	
Martinique	1348.000000	92.170000	42.640000	5.820000	21.220000	
Mexico	1447.896552	95.712069	49.854483	17.680690	42.423793	
Morocco	1166.954545	95.141818	49.725455	18.417273	41.380909	
Netherlands	1650.142857	94.834286	54.525000	13.259286	41.741429	
Norway	1453.000000	95.360000	48.900000	11.630000	22.570000	
Palestine	1909.000000	95.720000	64.710000	12.660000	54.370000	
Peru	978.000000	96.814000	48.882000	8.342000	27.174000	
Poland	1450.750000	91.037500	45.872500	14.687500	42.110000	
Portugal	1766.666667	91.348333	54.671667	17.136667	46.013333	
Russian Federation	1465.200000	95.214000	49.008000	12.566000	43.070000	
Singapore	1710.000000	95.510000	57.875000	14.825000	52.060000	
Spain	1180.925000	95.416250	48.128000	19.387250	38.898750	
Sweden	2310.142857	95.510000	48.870000	15.304286	42.837143	
Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769	
Syria	700.000000	97.730000	56.250000	27.590000	55.390000	
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143	
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333	
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765	
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667	

Country						
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...
China	14.150937	19.131484	66.323203	36.076797	3.350234	...
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...
France	14.303323	18.144246	68.253969	38.043754	3.987077	...
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...
India	15.218800	18.877600	67.590000	36.448000	4.284800	...
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...
Lebanon	17.886667	19.320000	69.653333	38.993333	4.616667	...
Luxembourg	18.420000	15.080000	67.540000	37.760000	2.550000	...
Malaysia	11.365000	19.785000	65.610000	33.875000	2.765000	...
Martinique	15.860000	17.580000	61.200000	32.640000	2.970000	...
Mexico	14.475517	19.086724	66.820172	37.476552	4.035690	...
Morocco	15.092727	19.106364	67.562273	39.191364	4.010000	...
Netherlands	15.422143	19.239286	66.140714	36.776429	4.399286	...
Norway	18.390000	18.860000	66.690000	36.340000	2.960000	...
Palestine	19.680000	22.470000	68.100000	38.340000	5.190000	...
Peru	12.648000	17.694000	64.694000	35.894000	2.342000	...
Poland	15.837500	17.127500	69.510000	37.850000	5.610000	...
Portugal	13.598333	19.120000	70.511667	39.573333	6.020000	...
Russian Federation	12.856000	18.190000	65.362000	35.560000	3.202000	...
Singapore	16.845000	19.620000	71.405000	37.830000	3.595000	...
Spain	14.534250	18.534500	68.586500	38.346250	3.595000	...
Sweden	13.571429	19.244286	65.941429	34.744286	3.494286	...
Switzerland	14.965385	18.973077	67.793846	37.250769	3.877692	...

Country					
Syria	14.580000	21.430000	72.860000	38.710000	3.290000	...
Thailand	15.767143	19.845714	67.105714	36.802857	4.047143	...
Turkey	13.855000	19.630000	65.350000	36.353333	3.866667	...
United Kingdom	13.719412	17.574118	68.757647	38.407647	4.081765	...
Vietnam	15.136667	19.066667	67.590000	37.188333	4.503333	...

	Comma	Colon	SemiC	QMark	Exclam	\
Country					
Afghanistan	7.600000	0.290000	0.140000	0.000000	0.000000
Argentina	6.660000	0.700000	0.190000	0.000000	0.000000
Armenia	6.210000	0.300000	0.050000	0.000000	0.000000
Austria	5.333333	0.831667	0.085000	0.071667	0.000000
Barbados	5.840000	0.290000	0.150000	0.000000	0.000000
Belgium	5.490000	0.390000	0.255714	0.000000	0.000000
Bermuda	4.840000	0.505000	0.235000	0.305000	0.000000
Brazil	6.341111	0.320000	0.076667	0.032222	0.011111
Bulgaria	5.460000	0.540000	0.090000	0.000000	0.000000
Burma	6.540000	1.150000	0.210000	0.000000	0.050000
Canada	4.960769	0.364615	0.065385	0.000000	0.000000
China	5.492500	0.581406	0.168281	0.035469	0.002812
Denmark	6.440000	0.605000	0.015000	0.132500	0.000000
Egypt	5.274167	0.928333	0.063333	0.011667	0.000000
Estonia	5.780000	0.330000	0.110000	0.110000	0.000000
France	5.226800	0.526092	0.117200	0.035785	0.004154
Georgia	5.560000	0.356667	0.086667	0.013333	0.016667
Germany	4.552857	0.454286	0.184286	0.085714	0.000000
Greece	5.346129	0.605161	0.123871	0.000000	0.000000
Hungary	4.495000	0.487500	0.235000	0.000000	0.000000
India	6.070800	0.469200	0.136800	0.014400	0.006000
Indonesia	6.570000	0.375000	0.180000	0.000000	0.000000
Ireland	5.504000	0.800000	0.210000	0.332000	0.000000
Israel	6.350000	0.470000	0.050000	0.000000	0.000000
Italy	5.460132	0.601667	0.125175	0.030044	0.004868
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000
Japan	5.297500	0.683214	0.130000	0.017500	0.004643
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000
Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000
Norway	5.640000	0.960000	0.210000	0.000000	0.000000
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000
Peru	5.628000	0.550000	0.026000	0.000000	0.000000

Country					
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000
France	1.153569	0.004892	1.444185	0.876677	1.249108
Georgia	0.943333	0.000000	1.450000	0.526667	2.063333
Germany	1.372857	0.004286	1.282857	0.301429	3.200000
Greece	1.011613	0.006452	0.725161	0.410968	1.102581
Hungary	0.982500	0.000000	0.560000	0.612500	2.255000
India	1.351600	0.000000	1.991200	0.691200	2.030400
Indonesia	1.430000	0.030000	0.665000	1.780000	1.580000
Ireland	1.330000	0.000000	3.254000	0.616000	1.206000
Israel	1.070000	0.000000	3.450000	0.930000	1.260000
Italy	1.134518	0.004561	1.355307	0.780746	1.277851
Jamaica	1.270000	0.000000	1.420000	1.720000	2.920000
Japan	1.207857	0.000000	1.271429	0.810000	1.641071
Jersey	0.841250	0.000000	1.142500	1.323750	3.186250
Latvia	1.500000	0.000000	5.760000	0.200000	2.710000
Lebanon	1.040000	0.000000	1.510000	0.690000	1.386667
Luxembourg	2.800000	0.000000	2.300000	0.630000	1.040000
Malaysia	1.375000	0.000000	1.440000	0.530000	4.075000

```
Martinique           1.410000  0.000000  0.300000  0.590000  6.080000
Mexico               1.539828  0.001552  1.297759  0.895690  1.517241
Morocco              0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands          1.603571  0.000000  2.865000  0.672857  1.208571
Norway               0.760000  0.000000  0.140000  2.060000  1.650000
Palestine            1.520000  0.000000  3.820000  0.840000  0.470000
Peru                 1.168000  0.000000  0.572000  0.368000  0.656000
Poland               1.010000  0.000000  2.065000  0.880000  0.865000
Portugal             1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation   1.280000  0.000000  1.440000  1.126000  1.060000
Singapore            1.110000  0.000000  2.310000  0.235000  0.760000
Spain                1.196750  0.002000  1.062000  0.897000  1.733500
Sweden               1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland          1.075385  0.003846  1.330769  0.756923  1.960769
Syria                2.570000  0.000000  3.000000  0.860000  0.430000
Thailand             1.134286  0.000000  2.298571  1.081429  1.437143
Turkey               1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom       0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam              1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.3.3 Show only the columns of "Affective processes" and its sub-codes

```
[79]: groupby_coun_mean_df_3[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]
```

```
[79]:               affect    posemo    negemo       anx     anger       sad
      Country
      Afghanistan   2.940000  1.590000  1.350000  0.000000  0.430000  0.140000
      Argentina     1.600000  0.860000  0.740000  0.040000  0.350000  0.040000
      Armenia       3.280000  1.800000  1.480000  0.050000  0.760000  0.180000
      Austria       2.810833  1.855833  0.956667  0.012500  0.585000  0.274167
      Barbados      2.920000  1.020000  1.750000  0.290000  0.440000  0.000000
      Belgium       2.187143  1.200000  0.984286  0.230000  0.405714  0.057143
      Bermuda       2.775000  1.305000  1.470000  0.150000  0.230000  0.120000
      Brazil        2.767778  1.716667  1.013333  0.087778  0.233333  0.237778
      Bulgaria      1.610000  1.070000  0.540000  0.090000  0.090000  0.090000
      Burma         2.040000  0.990000  1.050000  0.050000  0.680000  0.260000
      Canada        2.911538  1.883077  1.023077  0.181538  0.341538  0.160769
      China         2.635078  1.560156  1.043281  0.049766  0.481250  0.196094
      Denmark       3.295000  1.862500  1.370000  0.140000  0.402500  0.297500
      Egypt         2.270000  1.510000  0.730833  0.065833  0.330000  0.044167
      Estonia       2.780000  2.110000  0.670000  0.000000  0.440000  0.000000
      France        2.739415  1.757415  0.928062  0.086862  0.365077  0.143200
      Georgia       2.493333  1.416667  0.966667  0.090000  0.393333  0.043333
      Germany       2.295714  1.312857  0.982857  0.092857  0.534286  0.195714
      Greece        2.128387  1.460323  0.653871  0.069355  0.220323  0.173226
```

```
Hungary            2.382500  1.687500  0.695000  0.055000  0.220000  0.075000
India              2.718000  1.474000  1.182400  0.052000  0.644000  0.184800
Indonesia          3.265000  1.345000  1.925000  0.030000  1.015000  0.075000
Ireland            3.080000  2.024000  1.044000  0.100000  0.448000  0.148000
Israel             2.150000  1.210000  0.930000  0.090000  0.470000  0.190000
Italy              2.634868  1.678465  0.923816  0.087325  0.358465  0.176316
Jamaica            2.580000  1.350000  1.200000  0.070000  0.670000  0.150000
Japan              2.291071  1.596071  0.636786  0.069286  0.279643  0.110357
Jersey             2.957500  1.933750  1.016250  0.042500  0.577500  0.257500
Latvia             2.350000  1.200000  1.150000  0.000000  0.350000  0.200000
Lebanon            3.223333  2.590000  0.616667  0.156667  0.173333  0.073333
Luxembourg         2.420000  1.800000  0.630000  0.000000  0.290000  0.080000
Malaysia           2.945000  1.515000  1.335000  0.210000  0.525000  0.060000
Martinique         2.970000  1.340000  1.630000  0.150000  0.890000  0.070000
Mexico             2.617414  1.745690  0.846034  0.087069  0.329655  0.134828
Morocco            2.416364  1.610000  0.776818  0.010909  0.361818  0.148636
Netherlands        2.738571  1.794286  0.925714  0.058571  0.427143  0.155000
Norway             3.230000  1.510000  1.720000  0.000000  0.690000  0.140000
Palestine          3.090000  2.300000  0.790000  0.050000  0.370000  0.050000
Peru               2.462000  1.260000  1.194000  0.026000  0.480000  0.158000
Poland             2.607500  1.732500  0.840000  0.060000  0.370000  0.150000
Portugal           3.133333  2.103333  1.015000  0.030000  0.345000  0.286667
Russian Federation 2.674000  1.790000  0.846000  0.036000  0.298000  0.108000
Singapore          3.565000  2.485000  1.085000  0.000000  0.615000  0.060000
Spain              2.604250  1.636500  0.931000  0.099750  0.406000  0.163000
Sweden             2.962857  1.934286  1.000000  0.190000  0.384286  0.140000
Switzerland        3.032308  1.784615  1.144615  0.147692  0.468462  0.145385
Syria              3.570000  2.570000  1.000000  0.140000  0.290000  0.290000
Thailand           2.557143  1.511429  0.922857  0.057143  0.372857  0.048571
Turkey             2.328333  1.535000  0.793333  0.130000  0.420000  0.125000
United Kingdom     3.079412  1.823529  1.206471  0.077647  0.408824  0.241765
Vietnam            2.860000  1.853333  0.926667  0.068333  0.368333  0.120000
```

[80]: `groupby_con_mean_df_3[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]`

[80]:
```
                    affect    posemo    negemo       anx     anger       sad
Country
Afghanistan         2.940000  1.590000  1.350000  0.000000  0.430000  0.140000
Argentina           1.600000  0.860000  0.740000  0.040000  0.350000  0.040000
Armenia             3.280000  1.800000  1.480000  0.050000  0.760000  0.180000
Austria             2.810833  1.855833  0.956667  0.012500  0.585000  0.274167
Barbados            2.920000  1.020000  1.750000  0.290000  0.440000  0.000000
Belgium             2.187143  1.200000  0.984286  0.230000  0.405714  0.057143
Bermuda             2.775000  1.305000  1.470000  0.150000  0.230000  0.120000
Brazil              2.767778  1.716667  1.013333  0.087778  0.233333  0.237778
Bulgaria            1.610000  1.070000  0.540000  0.090000  0.090000  0.090000
Burma               2.040000  0.990000  1.050000  0.050000  0.680000  0.260000
```

Canada	2.911538	1.883077	1.023077	0.181538	0.341538	0.160769
China	2.635078	1.560156	1.043281	0.049766	0.481250	0.196094
Denmark	3.295000	1.862500	1.370000	0.140000	0.402500	0.297500
Egypt	2.270000	1.510000	0.730833	0.065833	0.330000	0.044167
Estonia	2.780000	2.110000	0.670000	0.000000	0.440000	0.000000
France	2.739415	1.757415	0.928062	0.086862	0.365077	0.143200
Georgia	2.493333	1.416667	0.966667	0.090000	0.393333	0.043333
Germany	2.295714	1.312857	0.982857	0.092857	0.534286	0.195714
Greece	2.128387	1.460323	0.653871	0.069355	0.220323	0.173226
Hungary	2.382500	1.687500	0.695000	0.055000	0.220000	0.075000
India	2.718000	1.474000	1.182400	0.052000	0.644000	0.184800
Indonesia	3.265000	1.345000	1.925000	0.030000	1.015000	0.075000
Ireland	3.080000	2.024000	1.044000	0.100000	0.448000	0.148000
Israel	2.150000	1.210000	0.930000	0.090000	0.470000	0.190000
Italy	2.634868	1.678465	0.923816	0.087325	0.358465	0.176316
Jamaica	2.580000	1.350000	1.200000	0.070000	0.670000	0.150000
Japan	2.291071	1.596071	0.636786	0.069286	0.279643	0.110357
Jersey	2.957500	1.933750	1.016250	0.042500	0.577500	0.257500
Latvia	2.350000	1.200000	1.150000	0.000000	0.350000	0.200000
Lebanon	3.223333	2.590000	0.616667	0.156667	0.173333	0.073333
Luxembourg	2.420000	1.800000	0.630000	0.000000	0.290000	0.080000
Malaysia	2.945000	1.515000	1.335000	0.210000	0.525000	0.060000
Martinique	2.970000	1.340000	1.630000	0.150000	0.890000	0.070000
Mexico	2.617414	1.745690	0.846034	0.087069	0.329655	0.134828
Morocco	2.416364	1.610000	0.776818	0.010909	0.361818	0.148636
Netherlands	2.738571	1.794286	0.925714	0.058571	0.427143	0.155000
Norway	3.230000	1.510000	1.720000	0.000000	0.690000	0.140000
Palestine	3.090000	2.300000	0.790000	0.050000	0.370000	0.050000
Peru	2.462000	1.260000	1.194000	0.026000	0.480000	0.158000
Poland	2.607500	1.732500	0.840000	0.060000	0.370000	0.150000
Portugal	3.133333	2.103333	1.015000	0.030000	0.345000	0.286667
Russian Federation	2.674000	1.790000	0.846000	0.036000	0.298000	0.108000
Singapore	3.565000	2.485000	1.085000	0.000000	0.615000	0.060000
Spain	2.604250	1.636500	0.931000	0.099750	0.406000	0.163000
Sweden	2.962857	1.934286	1.000000	0.190000	0.384286	0.140000
Switzerland	3.032308	1.784615	1.144615	0.147692	0.468462	0.145385
Syria	3.570000	2.570000	1.000000	0.140000	0.290000	0.290000
Thailand	2.557143	1.511429	0.922857	0.057143	0.372857	0.048571
Turkey	2.328333	1.535000	0.793333	0.130000	0.420000	0.125000
United Kingdom	3.079412	1.823529	1.206471	0.077647	0.408824	0.241765
Vietnam	2.860000	1.853333	0.926667	0.068333	0.368333	0.120000

4.3.4 Compare negative emotions for each country

```
[81]: plt.rcParams["figure.figsize"] = (5,16)
      groupby_coun_mean_df_3[['anx','anger','sad']].plot.barh()
```
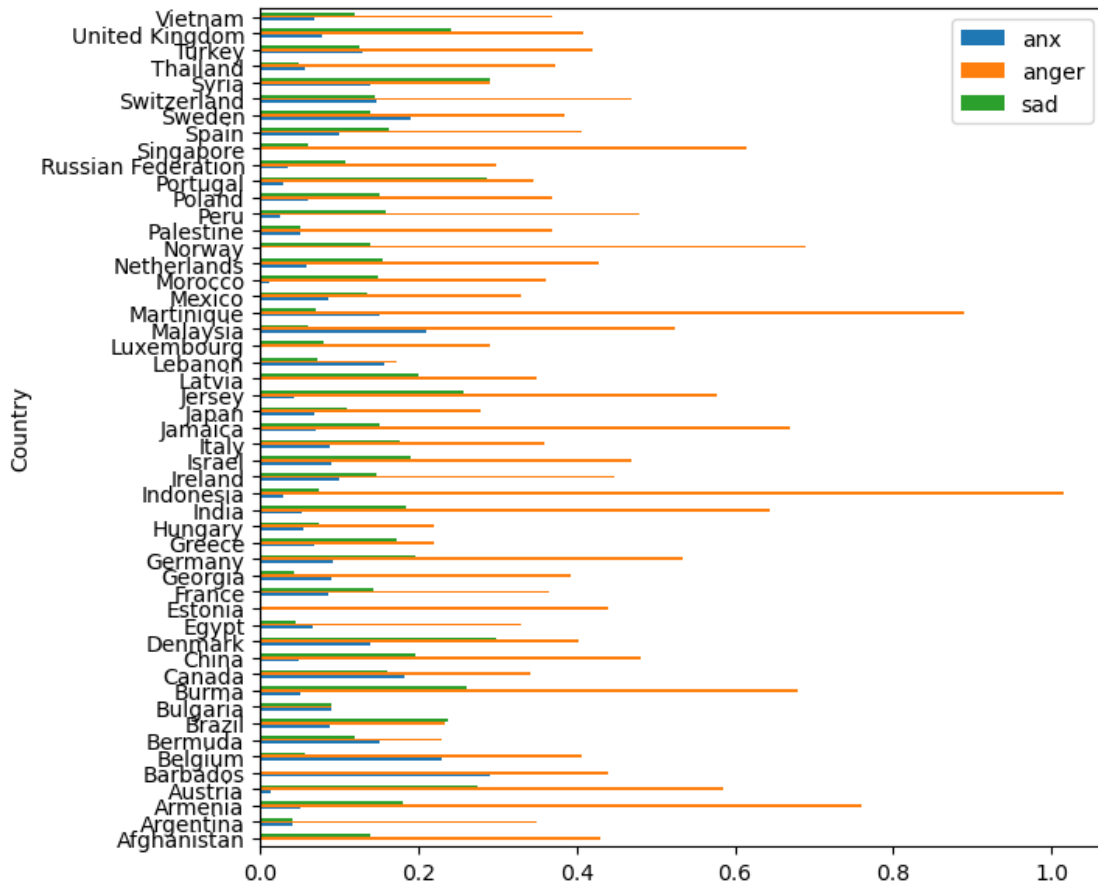
```
[81]: <Axes: ylabel='Country'>
```
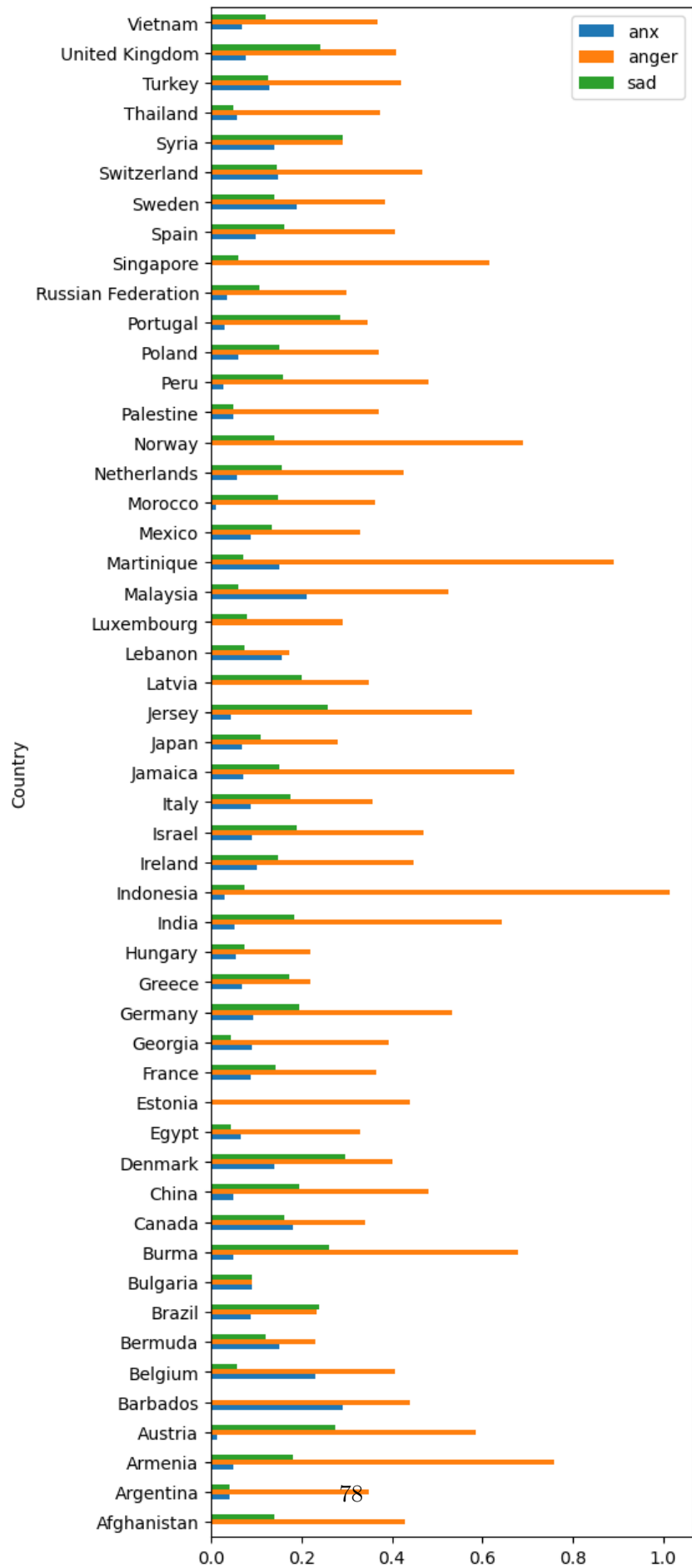
4.3.5 Compare negative emotions for each continent

```
[82]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_3[['anx','anger','sad']].plot.barh()
```
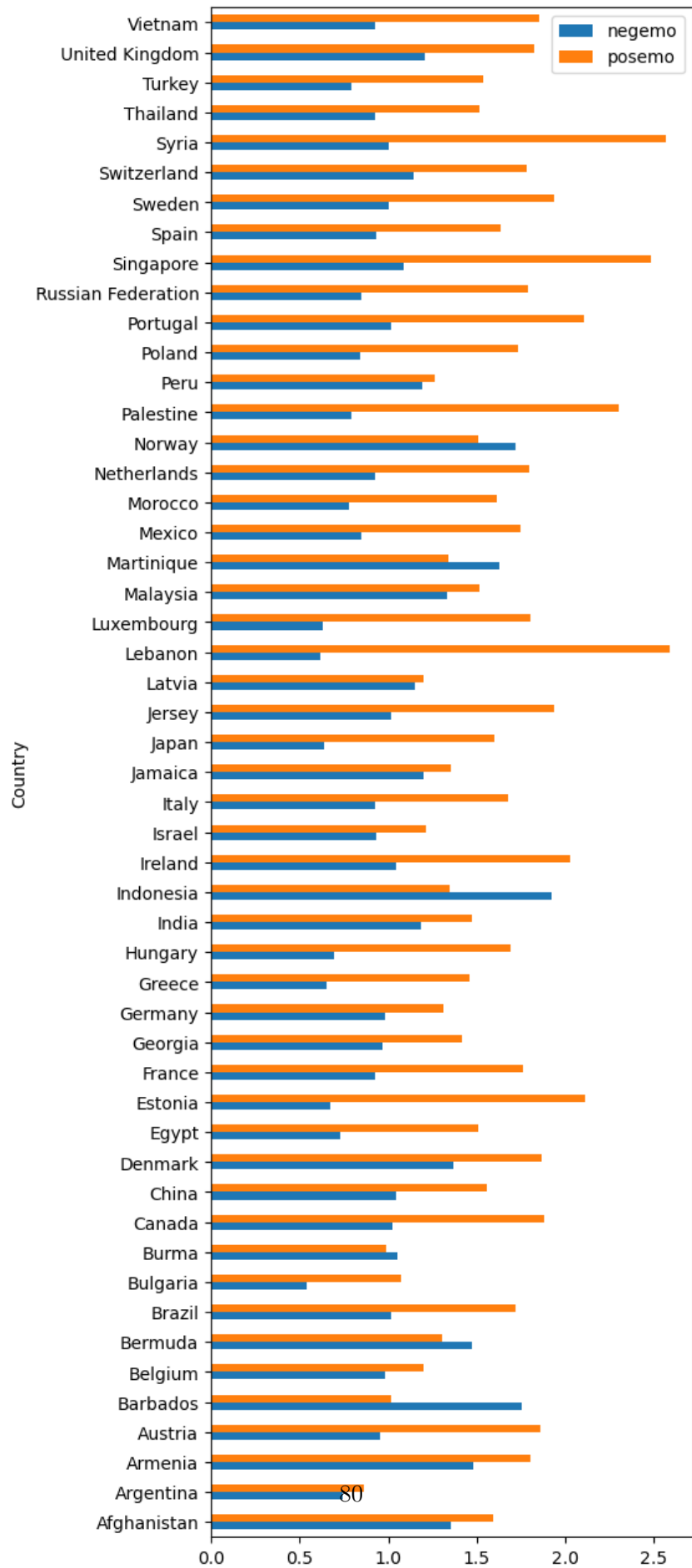
```
[82]: <Axes: ylabel='Country'>
```


4.3.6 Compare positive end negative emotions in each country

```
[83]: plt.rcParams["figure.figsize"] = (5,16)
      groupby_coun_mean_df_3[['negemo','posemo']].plot.barh()
```
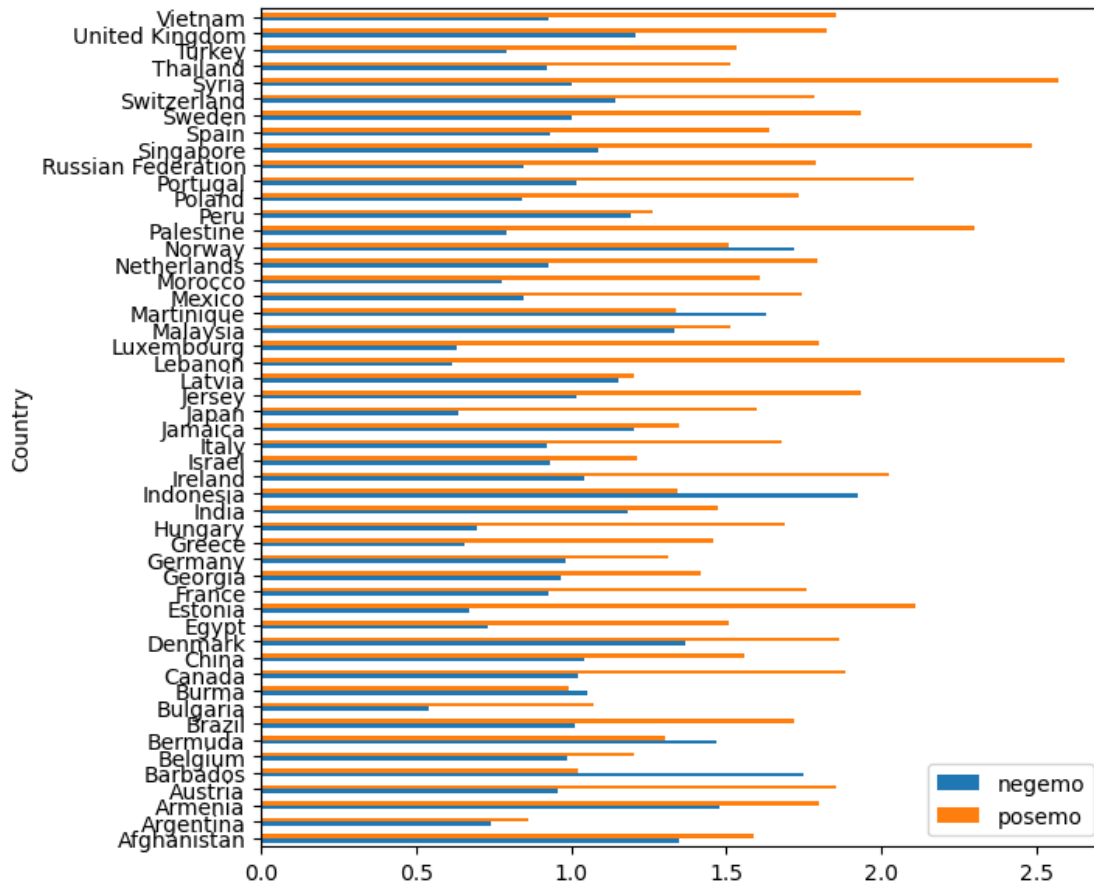
```
[83]: <Axes: ylabel='Country'>
```

80

4.3.7 Compare positive end negative emotions in each continent

```
[84]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_3[['negemo','posemo']].plot.barh()
```

```
[84]: <Axes: ylabel='Country'>
```


4.4   Era 4: 2010 - 2022

```
[85]: df4_liwc = pd.read_csv('./era4_LIWC2015.csv')
      df4_liwc = df4_liwc.drop("Source (A)",axis=1)

      df4_liwc.insert(1,"Country","")
      df4_liwc.insert(2,"Continent","")
      df4_liwc["Country"] = df_4["Country"]
      df4_liwc["Continent"] = df_4["Continent"]
```

```
df4_liwc = df4_liwc[df4_liwc['Country'] != "United States of America"]

df4_liwc
```

[85]:
```
                                              Source (B)          Country  \
0      I'VE made several concessions at my table in t...         Italy
1      Most trends arise not from inspiration but fro...      France
3      WHEN Julia Child introduced it to Americans ba...     Greece
4      Headnote Mastering Maialino's braise-worthy sa...  Netherlands
5      Headnote For some, mise en place is a dicey pr...      France
...                                                  ...          ...
2263   . At chef Gabriel Kreuther's New York City res...     China
2264   This easy, make-ahead casserole makes creative...     Italy
2265   When I was in graduate school, nearly a decade...  United Kingdom
2266   A coconut-milk dressing infused with garlic, g...
2267   Buttery and soft, tart and sweet, these muffin...

      Continent                                    Source (C)  \
0       Europe    Grain; Cooking; Restaurants; Recipes; Pasta
1       Europe                  Recipes; Corn; Cooking; Taste
3       Europe                  Recipes; Cooking; Vegetables
4       Europe         Restaurants; Cooking; Recipes; Pork
5       Europe             Cooking; Recipes; French language
...        ...                                           ...
2263      Asia   Honey; Heat; Eggs; Recipes; Berries; Cooking
2264    Europe                              Eggs; Recipes
2265    Europe                    Baked goods; Recipes; Tea
2266                                      Recipes; Tomatoes
2267                                      Recipes; Desserts

                                     Source (D)  \
0                              Cardboard No More
1                                   RECIPE REDUX
3        One Culture's Ratatouille Is Another's Fill-in...
4                                      THE CHEAT
5                             COOKING WITH DEXTER
...                                          ...
2263  The Most Flavorful Easter Ham Starts on the Stove
2264  Here to Help; A Recipe For English Muffin Brea...
2265                            To Steep and Slice
2266  Here to Help; A Recipe for Coconut Fish and To...
2267    Here to Help; A Recipe for Lemon Poppy Muffins

                                     Source (E)  Source (F)  \
0       New York Times, Late Edition (East Coast); New...    2010.0
1                   New York Times Magazine; New York       2010.0
3       New York Times, Late Edition (East Coast); New...    2010.0
```
```
82
```

```
4                    New York Times Magazine; New York       2010.0
5                    New York Times Magazine; New York       2010.0
...                                                    ...          ...
2263  New York Times, Late Edition (East Coast); New...      2022.0
2264  New York Times, Late Edition (East Coast); New...      2022.0
2265                 New York Times Magazine; New York       2022.0
2266  New York Times, Late Edition (East Coast); New...      2022.0
2267  New York Times, Late Edition (East Coast); New...      2022.0

            Source (G)    WC  Analytic  ...  Comma  Colon  SemiC  QMark  Exclam  \
0      New York, N.Y.   2209     93.79  ...   7.02   0.59   0.27   0.00    0.14
1          New York   1334     96.72  ...   4.72   0.37   0.22   0.00    0.00
3      New York, N.Y.    774     88.68  ...   5.68   0.13   0.39   0.00    0.00
4          New York   1485     96.34  ...   5.86   0.34   0.07   0.07    0.00
5          New York   1551     86.54  ...   5.48   0.26   0.13   0.13    0.00
...              ...    ...       ...  ...    ...    ...    ...    ...     ...
2263   New York, N.Y.   2882     96.79  ...   5.73   0.66   0.03   0.03    0.00
2264   New York, N.Y.    378     99.00  ...   5.29   1.06   0.53   0.00    0.00
2265         New York   1309     94.02  ...   6.72   0.46   0.23   0.08    0.00
2266   New York, N.Y.    361     98.79  ...   6.93   0.83   0.28   0.00    0.00
2267   New York, N.Y.    340     98.58  ...   7.06   1.47   0.00   0.00    0.00

       Dash  Quote  Apostro  Parenth  OtherP
0      3.08   1.36     0.86     0.72    1.31
1      1.35   1.05     1.42     0.60    0.22
3      2.84   0.00     1.29     1.03    0.00
4      1.41   0.67     1.28     0.40    0.00
5      0.64   2.19     1.55     0.26    0.00
...     ...    ...      ...      ...     ...
2263   0.97   0.62     0.80     1.11    1.28
2264   2.38   0.00     0.26     2.65    0.00
2265   1.45   0.92     1.83     0.76    0.53
2266   2.22   0.00     0.28     1.66    0.00
2267   0.88   0.00     0.88     1.76    0.00

[2109 rows x 101 columns]
```

4.4.1 Use groupby function to produce the mean value in each quantitative column for each country

```
[86]:  groupby_coun_mean_df_4 = df1_liwc.groupby("Country").mean(numeric_only=True)
       groupby_coun_mean_df_4 = groupby_coun_mean_df_4.drop(groupby_coun_mean_df_4.
        ↪index[0])
       groupby_coun_mean_df_4 = groupby_coun_mean_df_4.drop("Source (F)",axis=1)
       groupby_coun_mean_df_4
```

[86]:

Country	WC	Analytic	Clout	Authentic	Tone \
Afghanistan	2078.000000	94.380000	58.740000	18.370000	29.800000
Argentina	2567.000000	98.110000	52.030000	14.780000	27.710000
Armenia	4330.000000	93.470000	43.940000	24.620000	31.270000
Austria	1194.083333	95.870000	56.314167	14.162500	42.167500
Barbados	685.000000	88.370000	36.290000	25.670000	15.500000
Belgium	833.142857	97.494286	47.518571	20.001429	31.001429
Bermuda	541.000000	90.295000	48.145000	24.885000	23.545000
Brazil	1744.666667	95.586667	47.893333	18.612222	38.496667
Bulgaria	1118.000000	96.450000	42.540000	9.800000	35.120000
Burma	1912.000000	94.640000	63.310000	20.990000	24.930000
Canada	1059.692308	95.527692	48.241538	19.528462	41.510000
China	1402.625000	95.066641	48.824375	18.128047	35.558750
Denmark	947.500000	89.425000	54.180000	10.857500	34.347500
Egypt	1174.250000	97.278333	55.270833	23.430833	39.959167
Estonia	899.000000	97.170000	60.540000	25.940000	52.920000
France	1526.578462	96.130708	50.012646	17.612769	41.174892
Georgia	2040.666667	98.043333	51.456667	18.253333	34.220000
Germany	1404.285714	94.748571	53.110000	15.520000	32.054286
Greece	1025.709677	95.969677	45.147742	15.301613	40.556452
Hungary	1649.250000	96.645000	46.395000	14.622500	44.110000
India	1725.800000	94.903600	52.015600	17.686000	31.194000
Indonesia	1516.500000	95.740000	46.640000	7.640000	18.345000
Ireland	1994.000000	89.526000	56.042000	19.410000	43.746000
Israel	2143.000000	87.490000	51.870000	17.530000	30.500000
Italy	1384.706140	95.111140	49.084649	17.567368	39.806184
Jamaica	2673.000000	95.940000	51.050000	17.590000	28.260000
Japan	1699.535714	95.610357	50.469643	18.332143	43.664643
Jersey	1614.125000	95.925000	47.405000	18.570000	42.515000
Latvia	1996.000000	97.610000	59.700000	11.290000	26.600000
Lebanon	1979.333333	95.763333	59.640000	14.326667	62.370000
Luxembourg	2394.000000	97.740000	51.840000	21.620000	47.390000
Malaysia	1934.500000	94.100000	48.880000	14.080000	29.370000
Martinique	1348.000000	92.170000	42.640000	5.820000	21.220000
Mexico	1447.896552	95.712069	49.854483	17.680690	42.423793
Morocco	1166.954545	95.141818	49.725455	18.417273	41.380909
Netherlands	1650.142857	94.834286	54.525000	13.259286	41.741429
Norway	1453.000000	95.360000	48.900000	11.630000	22.570000
Palestine	1909.000000	95.720000	64.710000	12.660000	54.370000
Peru	978.000000	96.814000	48.882000	8.342000	27.174000
Poland	1450.750000	91.037500	45.872500	14.687500	42.110000
Portugal	1766.666667	91.348333	54.671667	17.136667	46.013333
Russian Federation	1465.200000	95.214000	49.008000	12.566000	43.070000
Singapore	1710.000000	95.510000	57.875000	14.825000	52.060000
Spain	1180.925000	95.416250	48.128000	19.387250	38.898750
Sweden	2310.142857	95.510000	48.870000	15.304286	42.837143

Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769
Syria	700.000000	97.730000	56.250000	27.590000	55.390000
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667

	WPS	Sixltr	Dic	function	pronoun	...	\
Country						...	
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...	
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...	
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...	
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...	
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...	
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...	
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...	
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...	
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...	
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...	
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...	
China	14.150937	19.131484	66.323203	36.076797	3.350234	...	
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...	
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...	
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...	
France	14.303323	18.144246	68.253969	38.043754	3.987077	...	
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...	
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...	
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...	
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...	
India	15.218800	18.877600	67.590000	36.448000	4.284800	...	
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...	
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...	
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...	
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...	
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...	
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...	
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...	
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...	
Lebanon	17.886667	19.320000	69.653333	38.993333	4.616667	...	
Luxembourg	18.420000	15.080000	67.540000	37.760000	2.550000	...	
Malaysia	11.365000	19.785000	65.610000	33.875000	2.765000	...	
Martinique	15.860000	17.580000	61.200000	32.640000	2.970000	...	
Mexico	14.475517	19.086724	66.820172	37.476552	4.035690	...	
Morocco	15.092727	19.106364	67.562273	39.191364	4.010000	...	
Netherlands	15.422143	19.239286	66.140714	36.776429	4.399286	...	
Norway	18.390000	18.860000	66.690000	36.340000	2.960000	...	
Palestine	19.680000	22.470000	68.100000	38.340000	5.190000	...	

Peru	12.648000	17.694000	64.694000	35.894000	2.342000	...
Poland	15.837500	17.127500	69.510000	37.850000	5.610000	...
Portugal	13.598333	19.120000	70.511667	39.573333	6.020000	...
Russian Federation	12.856000	18.190000	65.362000	35.560000	3.202000	...
Singapore	16.845000	19.620000	71.405000	37.830000	3.595000	...
Spain	14.534250	18.534500	68.586500	38.346250	3.595000	...
Sweden	13.571429	19.244286	65.941429	34.744286	3.494286	...
Switzerland	14.965385	18.973077	67.793846	37.250769	3.877692	...
Syria	14.580000	21.430000	72.860000	38.710000	3.290000	...
Thailand	15.767143	19.845714	67.105714	36.802857	4.047143	...
Turkey	13.855000	19.630000	65.350000	36.353333	3.866667	...
United Kingdom	13.719412	17.574118	68.757647	38.407647	4.081765	...
Vietnam	15.136667	19.066667	67.590000	37.188333	4.503333	...

	Comma	Colon	SemiC	QMark	Exclam	\
Country						
Afghanistan	7.600000	0.290000	0.140000	0.000000	0.000000	
Argentina	6.660000	0.700000	0.190000	0.000000	0.000000	
Armenia	6.210000	0.300000	0.050000	0.000000	0.000000	
Austria	5.333333	0.831667	0.085000	0.071667	0.000000	
Barbados	5.840000	0.290000	0.150000	0.000000	0.000000	
Belgium	5.490000	0.390000	0.255714	0.000000	0.000000	
Bermuda	4.840000	0.505000	0.235000	0.305000	0.000000	
Brazil	6.341111	0.320000	0.076667	0.032222	0.011111	
Bulgaria	5.460000	0.540000	0.090000	0.000000	0.000000	
Burma	6.540000	1.150000	0.210000	0.000000	0.050000	
Canada	4.960769	0.364615	0.065385	0.000000	0.000000	
China	5.492500	0.581406	0.168281	0.035469	0.002812	
Denmark	6.440000	0.605000	0.015000	0.132500	0.000000	
Egypt	5.274167	0.928333	0.063333	0.011667	0.000000	
Estonia	5.780000	0.330000	0.110000	0.110000	0.000000	
France	5.226800	0.526092	0.117200	0.035785	0.004154	
Georgia	5.560000	0.356667	0.086667	0.013333	0.016667	
Germany	4.552857	0.454286	0.184286	0.085714	0.000000	
Greece	5.346129	0.605161	0.123871	0.000000	0.000000	
Hungary	4.495000	0.487500	0.235000	0.000000	0.000000	
India	6.070800	0.469200	0.136800	0.014400	0.006000	
Indonesia	6.570000	0.375000	0.180000	0.000000	0.000000	
Ireland	5.504000	0.800000	0.210000	0.332000	0.000000	
Israel	6.350000	0.470000	0.050000	0.000000	0.000000	
Italy	5.460132	0.601667	0.125175	0.030044	0.004868	
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000	
Japan	5.297500	0.683214	0.130000	0.017500	0.004643	
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000	
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000	
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667	
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000	

Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000
Norway	5.640000	0.960000	0.210000	0.000000	0.000000
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000
Peru	5.628000	0.550000	0.026000	0.000000	0.000000
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000
France	1.153569	0.004892	1.444185	0.876677	1.249108
Georgia	0.943333	0.000000	1.450000	0.526667	2.063333
Germany	1.372857	0.004286	1.282857	0.301429	3.200000
Greece	1.011613	0.006452	0.725161	0.410968	1.102581
Hungary	0.982500	0.000000	0.560000	0.612500	2.255000
India	1.351600	0.000000	1.991200	0.691200	2.030400
Indonesia	1.430000	0.030000	0.665000	1.780000	1.580000
Ireland	1.330000	0.000000	3.254000	0.616000	1.206000
Israel	1.070000	0.000000	3.450000	0.930000	1.260000

```
Italy                1.134518  0.004561  1.355307  0.780746  1.277851
Jamaica              1.270000  0.000000  1.420000  1.720000  2.920000
Japan                1.207857  0.000000  1.271429  0.810000  1.641071
Jersey               0.841250  0.000000  1.142500  1.323750  3.186250
Latvia               1.500000  0.000000  5.760000  0.200000  2.710000
Lebanon              1.040000  0.000000  1.510000  0.690000  1.386667
Luxembourg           2.800000  0.000000  2.300000  0.630000  1.040000
Malaysia             1.375000  0.000000  1.440000  0.530000  4.075000
Martinique           1.410000  0.000000  0.300000  0.590000  6.080000
Mexico               1.539828  0.001552  1.297759  0.895690  1.517241
Morocco              0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands          1.603571  0.000000  2.865000  0.672857  1.208571
Norway               0.760000  0.000000  0.140000  2.060000  1.650000
Palestine            1.520000  0.000000  3.820000  0.840000  0.470000
Peru                 1.168000  0.000000  0.572000  0.368000  0.656000
Poland               1.010000  0.000000  2.065000  0.880000  0.865000
Portugal             1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation   1.280000  0.000000  1.440000  1.126000  1.060000
Singapore            1.110000  0.000000  2.310000  0.235000  0.760000
Spain                1.196750  0.002000  1.062000  0.897000  1.733500
Sweden               1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland          1.075385  0.003846  1.330769  0.756923  1.960769
Syria                2.570000  0.000000  3.000000  0.860000  0.430000
Thailand             1.134286  0.000000  2.298571  1.081429  1.437143
Turkey               1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom       0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam              1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.4.2 Use groupby function to produce the mean value in each quantitative column for each continent

```
[87]: groupby_con_mean_df_4 = df1_liwc.groupby("Country").mean(numeric_only=True)
      groupby_con_mean_df_4 = groupby_con_mean_df_4.drop(groupby_con_mean_df_4.
       ↪index[0])
      groupby_con_mean_df_4 = groupby_con_mean_df_4.drop("Source (F)",axis=1)
      groupby_con_mean_df_4
```

```
[87]:                       WC     Analytic      Clout   Authentic        Tone  \
      Country
      Afghanistan     2078.000000  94.380000  58.740000  18.370000  29.800000
      Argentina       2567.000000  98.110000  52.030000  14.780000  27.710000
      Armenia         4330.000000  93.470000  43.940000  24.620000  31.270000
      Austria         1194.083333  95.870000  56.314167  14.162500  42.167500
      Barbados         685.000000  88.370000  36.290000  25.670000  15.500000
      Belgium          833.142857  97.494286  47.518571  20.001429  31.001429
```

Bermuda	541.000000	90.295000	48.145000	24.885000	23.545000
Brazil	1744.666667	95.586667	47.893333	18.612222	38.496667
Bulgaria	1118.000000	96.450000	42.540000	9.800000	35.120000
Burma	1912.000000	94.640000	63.310000	20.990000	24.930000
Canada	1059.692308	95.527692	48.241538	19.528462	41.510000
China	1402.625000	95.066641	48.824375	18.128047	35.558750
Denmark	947.500000	89.425000	54.180000	10.857500	34.347500
Egypt	1174.250000	97.278333	55.270833	23.430833	39.959167
Estonia	899.000000	97.170000	60.540000	25.940000	52.920000
France	1526.578462	96.130708	50.012646	17.612769	41.174892
Georgia	2040.666667	98.043333	51.456667	18.253333	34.220000
Germany	1404.285714	94.748571	53.110000	15.520000	32.054286
Greece	1025.709677	95.969677	45.147742	15.301613	40.556452
Hungary	1649.250000	96.645000	46.395000	14.622500	44.110000
India	1725.800000	94.903600	52.015600	17.686000	31.194000
Indonesia	1516.500000	95.740000	46.640000	7.640000	18.345000
Ireland	1994.000000	89.526000	56.042000	19.410000	43.746000
Israel	2143.000000	87.490000	51.870000	17.530000	30.500000
Italy	1384.706140	95.111140	49.084649	17.567368	39.806184
Jamaica	2673.000000	95.940000	51.050000	17.590000	28.260000
Japan	1699.535714	95.610357	50.469643	18.332143	43.664643
Jersey	1614.125000	95.925000	47.405000	18.570000	42.515000
Latvia	1996.000000	97.610000	59.700000	11.290000	26.600000
Lebanon	1979.333333	95.763333	59.640000	14.326667	62.370000
Luxembourg	2394.000000	97.740000	51.840000	21.620000	47.390000
Malaysia	1934.500000	94.100000	48.880000	14.080000	29.370000
Martinique	1348.000000	92.170000	42.640000	5.820000	21.220000
Mexico	1447.896552	95.712069	49.854483	17.680690	42.423793
Morocco	1166.954545	95.141818	49.725455	18.417273	41.380909
Netherlands	1650.142857	94.834286	54.525000	13.259286	41.741429
Norway	1453.000000	95.360000	48.900000	11.630000	22.570000
Palestine	1909.000000	95.720000	64.710000	12.660000	54.370000
Peru	978.000000	96.814000	48.882000	8.342000	27.174000
Poland	1450.750000	91.037500	45.872500	14.687500	42.110000
Portugal	1766.666667	91.348333	54.671667	17.136667	46.013333
Russian Federation	1465.200000	95.214000	49.008000	12.566000	43.070000
Singapore	1710.000000	95.510000	57.875000	14.825000	52.060000
Spain	1180.925000	95.416250	48.128000	19.387250	38.898750
Sweden	2310.142857	95.510000	48.870000	15.304286	42.837143
Switzerland	2088.461538	95.963077	48.576154	13.411538	37.230769
Syria	700.000000	97.730000	56.250000	27.590000	55.390000
Thailand	1892.857143	95.334286	52.005714	16.937143	36.967143
Turkey	966.833333	95.601667	50.925000	11.990000	39.153333
United Kingdom	1443.647059	97.135294	48.982353	24.242353	37.231765
Vietnam	2016.166667	95.033333	55.100000	16.225000	42.981667

WPS	Sixltr	Dic	function	pronoun	... \

Country						
Afghanistan	12.440000	18.000000	68.910000	34.840000	4.760000	...
Argentina	14.030000	18.970000	63.460000	34.980000	2.690000	...
Armenia	14.680000	18.500000	71.060000	38.240000	3.720000	...
Austria	14.876667	19.186667	69.585000	37.369167	4.441667	...
Barbados	11.420000	20.290000	71.390000	37.960000	5.840000	...
Belgium	15.167143	21.214286	63.952857	33.472857	2.134286	...
Bermuda	11.070000	14.635000	71.800000	41.750000	6.170000	...
Brazil	14.442222	19.094444	67.278889	38.577778	3.870000	...
Bulgaria	12.150000	20.660000	65.470000	38.100000	3.130000	...
Burma	17.700000	18.360000	66.740000	36.040000	4.500000	...
Canada	14.713077	17.750769	68.160769	38.068462	3.740000	...
China	14.150937	19.131484	66.323203	36.076797	3.350234	...
Denmark	12.790000	17.910000	73.430000	40.722500	6.890000	...
Egypt	13.406667	19.245000	69.165833	36.812500	2.771667	...
Estonia	18.350000	22.910000	69.190000	37.820000	4.340000	...
France	14.303323	18.144246	68.253969	38.043754	3.987077	...
Georgia	15.933333	19.453333	64.723333	35.946667	2.813333	...
Germany	12.870000	18.097143	66.775714	37.560000	3.694286	...
Greece	14.264839	18.810968	64.129355	35.644839	2.827097	...
Hungary	13.915000	19.265000	64.307500	33.332500	1.610000	...
India	15.218800	18.877600	67.590000	36.448000	4.284800	...
Indonesia	11.835000	18.295000	61.005000	31.665000	2.320000	...
Ireland	14.110000	19.476000	70.716000	38.912000	5.728000	...
Israel	15.420000	18.760000	67.570000	37.840000	4.810000	...
Italy	14.467588	18.800351	67.673289	37.624079	3.768904	...
Jamaica	17.130000	22.630000	63.370000	33.600000	2.280000	...
Japan	14.178571	19.909286	65.258571	36.512857	3.327143	...
Jersey	16.186250	20.435000	65.820000	35.992500	2.697500	...
Latvia	13.770000	17.030000	70.940000	39.280000	4.610000	...
Lebanon	17.886667	19.320000	69.653333	38.993333	4.616667	...
Luxembourg	18.420000	15.080000	67.540000	37.760000	2.550000	...
Malaysia	11.365000	19.785000	65.610000	33.875000	2.765000	...
Martinique	15.860000	17.580000	61.200000	32.640000	2.970000	...
Mexico	14.475517	19.086724	66.820172	37.476552	4.035690	...
Morocco	15.092727	19.106364	67.562273	39.191364	4.010000	...
Netherlands	15.422143	19.239286	66.140714	36.776429	4.399286	...
Norway	18.390000	18.860000	66.690000	36.340000	2.960000	...
Palestine	19.680000	22.470000	68.100000	38.340000	5.190000	...
Peru	12.648000	17.694000	64.694000	35.894000	2.342000	...
Poland	15.837500	17.127500	69.510000	37.850000	5.610000	...
Portugal	13.598333	19.120000	70.511667	39.573333	6.020000	...
Russian Federation	12.856000	18.190000	65.362000	35.560000	3.202000	...
Singapore	16.845000	19.620000	71.405000	37.830000	3.595000	...
Spain	14.534250	18.534500	68.586500	38.346250	3.595000	...
Sweden	13.571429	19.244286	65.941429	34.744286	3.494286	...
Switzerland	14.965385	18.973077	67.793846	37.250769	3.877692	...

Country					
Syria	14.580000	21.430000	72.860000	38.710000	3.290000	...
Thailand	15.767143	19.845714	67.105714	36.802857	4.047143	...
Turkey	13.855000	19.630000	65.350000	36.353333	3.866667	...
United Kingdom	13.719412	17.574118	68.757647	38.407647	4.081765	...
Vietnam	15.136667	19.066667	67.590000	37.188333	4.503333	...

	Comma	Colon	SemiC	QMark	Exclam	\
Country						
Afghanistan	7.600000	0.290000	0.140000	0.000000	0.000000	
Argentina	6.660000	0.700000	0.190000	0.000000	0.000000	
Armenia	6.210000	0.300000	0.050000	0.000000	0.000000	
Austria	5.333333	0.831667	0.085000	0.071667	0.000000	
Barbados	5.840000	0.290000	0.150000	0.000000	0.000000	
Belgium	5.490000	0.390000	0.255714	0.000000	0.000000	
Bermuda	4.840000	0.505000	0.235000	0.305000	0.000000	
Brazil	6.341111	0.320000	0.076667	0.032222	0.011111	
Bulgaria	5.460000	0.540000	0.090000	0.000000	0.000000	
Burma	6.540000	1.150000	0.210000	0.000000	0.050000	
Canada	4.960769	0.364615	0.065385	0.000000	0.000000	
China	5.492500	0.581406	0.168281	0.035469	0.002812	
Denmark	6.440000	0.605000	0.015000	0.132500	0.000000	
Egypt	5.274167	0.928333	0.063333	0.011667	0.000000	
Estonia	5.780000	0.330000	0.110000	0.110000	0.000000	
France	5.226800	0.526092	0.117200	0.035785	0.004154	
Georgia	5.560000	0.356667	0.086667	0.013333	0.016667	
Germany	4.552857	0.454286	0.184286	0.085714	0.000000	
Greece	5.346129	0.605161	0.123871	0.000000	0.000000	
Hungary	4.495000	0.487500	0.235000	0.000000	0.000000	
India	6.070800	0.469200	0.136800	0.014400	0.006000	
Indonesia	6.570000	0.375000	0.180000	0.000000	0.000000	
Ireland	5.504000	0.800000	0.210000	0.332000	0.000000	
Israel	6.350000	0.470000	0.050000	0.000000	0.000000	
Italy	5.460132	0.601667	0.125175	0.030044	0.004868	
Jamaica	8.190000	0.340000	0.040000	0.000000	0.000000	
Japan	5.297500	0.683214	0.130000	0.017500	0.004643	
Jersey	7.520000	0.372500	0.068750	0.018750	0.000000	
Latvia	7.520000	0.350000	0.100000	0.000000	0.000000	
Lebanon	6.520000	0.356667	0.273333	0.000000	0.026667	
Luxembourg	5.680000	0.330000	0.080000	0.000000	0.000000	
Malaysia	6.370000	0.500000	0.225000	0.000000	0.000000	
Martinique	6.380000	0.370000	0.070000	0.000000	0.070000	
Mexico	5.269828	0.732931	0.070690	0.018621	0.000690	
Morocco	5.594091	0.416818	0.122727	0.046364	0.000000	
Netherlands	5.844286	0.502143	0.118571	0.024286	0.005000	
Norway	5.640000	0.960000	0.210000	0.000000	0.000000	
Palestine	6.760000	0.470000	0.100000	0.050000	0.000000	
Peru	5.628000	0.550000	0.026000	0.000000	0.000000	

Country					
Poland	6.007500	0.367500	0.185000	0.000000	0.000000
Portugal	5.743333	0.453333	0.168333	0.145000	0.008333
Russian Federation	5.958000	0.448000	0.224000	0.022000	0.022000
Singapore	6.780000	0.405000	0.000000	0.060000	0.000000
Spain	5.324750	0.392750	0.083000	0.031750	0.007750
Sweden	5.931429	0.625714	0.152857	0.037143	0.005714
Switzerland	5.867692	0.467692	0.096923	0.070769	0.000000
Syria	5.000000	0.290000	0.000000	0.140000	0.000000
Thailand	5.794286	0.565714	0.211429	0.077143	0.040000
Turkey	4.913333	0.581667	0.133333	0.121667	0.000000
United Kingdom	5.108824	0.452941	0.053529	0.061765	0.002353
Vietnam	5.863333	0.386667	0.068333	0.000000	0.015000

	Dash	Quote	Apostro	Parenth	OtherP
Country					
Afghanistan	0.670000	0.000000	3.080000	1.250000	3.220000
Argentina	1.440000	0.000000	0.580000	1.360000	0.660000
Armenia	2.240000	0.000000	0.600000	0.690000	0.650000
Austria	1.309167	0.039167	2.800833	1.332500	0.953333
Barbados	0.880000	0.000000	0.000000	0.290000	0.730000
Belgium	1.162857	0.000000	0.217143	0.670000	1.964286
Bermuda	1.445000	0.000000	0.350000	0.775000	0.545000
Brazil	1.264444	0.000000	1.458889	0.745556	1.073333
Bulgaria	0.810000	0.000000	0.450000	1.070000	1.430000
Burma	1.050000	0.000000	3.970000	1.360000	1.150000
Canada	1.200000	0.000000	0.932308	0.683846	1.009231
China	1.173516	0.009297	1.010859	0.712422	2.026562
Denmark	0.870000	0.000000	4.015000	0.282500	0.590000
Egypt	1.274167	0.000000	0.762500	0.153333	0.992500
Estonia	8.450000	0.000000	1.220000	2.000000	1.000000
France	1.153569	0.004892	1.444185	0.876677	1.249108
Georgia	0.943333	0.000000	1.450000	0.526667	2.063333
Germany	1.372857	0.004286	1.282857	0.301429	3.200000
Greece	1.011613	0.006452	0.725161	0.410968	1.102581
Hungary	0.982500	0.000000	0.560000	0.612500	2.255000
India	1.351600	0.000000	1.991200	0.691200	2.030400
Indonesia	1.430000	0.030000	0.665000	1.780000	1.580000
Ireland	1.330000	0.000000	3.254000	0.616000	1.206000
Israel	1.070000	0.000000	3.450000	0.930000	1.260000
Italy	1.134518	0.004561	1.355307	0.780746	1.277851
Jamaica	1.270000	0.000000	1.420000	1.720000	2.920000
Japan	1.207857	0.000000	1.271429	0.810000	1.641071
Jersey	0.841250	0.000000	1.142500	1.323750	3.186250
Latvia	1.500000	0.000000	5.760000	0.200000	2.710000
Lebanon	1.040000	0.000000	1.510000	0.690000	1.386667
Luxembourg	2.800000	0.000000	2.300000	0.630000	1.040000
Malaysia	1.375000	0.000000	1.440000	0.530000	4.075000

```
Martinique            1.410000  0.000000  0.300000  0.590000  6.080000
Mexico                1.539828  0.001552  1.297759  0.895690  1.517241
Morocco               0.961364  0.000000  0.535455  0.841364  1.594545
Netherlands           1.603571  0.000000  2.865000  0.672857  1.208571
Norway                0.760000  0.000000  0.140000  2.060000  1.650000
Palestine             1.520000  0.000000  3.820000  0.840000  0.470000
Peru                  1.168000  0.000000  0.572000  0.368000  0.656000
Poland                1.010000  0.000000  2.065000  0.880000  0.865000
Portugal              1.391667  0.028333  4.128333  0.825000  1.115000
Russian Federation    1.280000  0.000000  1.440000  1.126000  1.060000
Singapore             1.110000  0.000000  2.310000  0.235000  0.760000
Spain                 1.196750  0.002000  1.062000  0.897000  1.733500
Sweden                1.035714  0.004286  2.001429  1.207143  1.084286
Switzerland           1.075385  0.003846  1.330769  0.756923  1.960769
Syria                 2.570000  0.000000  3.000000  0.860000  0.430000
Thailand              1.134286  0.000000  2.298571  1.081429  1.437143
Turkey                1.031667  0.000000  1.600000  0.430000  0.946667
United Kingdom        0.970000  0.000000  1.460000  0.935294  1.944118
Vietnam               1.126667  0.000000  2.645000  1.141667  1.460000

[51 rows x 93 columns]
```

4.4.3 Show only the columns of "Affective processes" and its sub-codes

```
[88]: groupby_coun_mean_df_4[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]
```

```
[88]:                  affect    posemo    negemo       anx     anger       sad
      Country
      Afghanistan    2.940000  1.590000  1.350000  0.000000  0.430000  0.140000
      Argentina      1.600000  0.860000  0.740000  0.040000  0.350000  0.040000
      Armenia        3.280000  1.800000  1.480000  0.050000  0.760000  0.180000
      Austria        2.810833  1.855833  0.956667  0.012500  0.585000  0.274167
      Barbados       2.920000  1.020000  1.750000  0.290000  0.440000  0.000000
      Belgium        2.187143  1.200000  0.984286  0.230000  0.405714  0.057143
      Bermuda        2.775000  1.305000  1.470000  0.150000  0.230000  0.120000
      Brazil         2.767778  1.716667  1.013333  0.087778  0.233333  0.237778
      Bulgaria       1.610000  1.070000  0.540000  0.090000  0.090000  0.090000
      Burma          2.040000  0.990000  1.050000  0.050000  0.680000  0.260000
      Canada         2.911538  1.883077  1.023077  0.181538  0.341538  0.160769
      China          2.635078  1.560156  1.043281  0.049766  0.481250  0.196094
      Denmark        3.295000  1.862500  1.370000  0.140000  0.402500  0.297500
      Egypt          2.270000  1.510000  0.730833  0.065833  0.330000  0.044167
      Estonia        2.780000  2.110000  0.670000  0.000000  0.440000  0.000000
      France         2.739415  1.757415  0.928062  0.086862  0.365077  0.143200
      Georgia        2.493333  1.416667  0.966667  0.090000  0.393333  0.043333
      Germany        2.295714  1.312857  0.982857  0.092857  0.534286  0.195714
      Greece         2.128387  1.460323  0.653871  0.069355  0.220323  0.173226
```

```
Hungary             2.382500  1.687500  0.695000  0.055000  0.220000  0.075000
India               2.718000  1.474000  1.182400  0.052000  0.644000  0.184800
Indonesia           3.265000  1.345000  1.925000  0.030000  1.015000  0.075000
Ireland             3.080000  2.024000  1.044000  0.100000  0.448000  0.148000
Israel              2.150000  1.210000  0.930000  0.090000  0.470000  0.190000
Italy               2.634868  1.678465  0.923816  0.087325  0.358465  0.176316
Jamaica             2.580000  1.350000  1.200000  0.070000  0.670000  0.150000
Japan               2.291071  1.596071  0.636786  0.069286  0.279643  0.110357
Jersey              2.957500  1.933750  1.016250  0.042500  0.577500  0.257500
Latvia              2.350000  1.200000  1.150000  0.000000  0.350000  0.200000
Lebanon             3.223333  2.590000  0.616667  0.156667  0.173333  0.073333
Luxembourg          2.420000  1.800000  0.630000  0.000000  0.290000  0.080000
Malaysia            2.945000  1.515000  1.335000  0.210000  0.525000  0.060000
Martinique          2.970000  1.340000  1.630000  0.150000  0.890000  0.070000
Mexico              2.617414  1.745690  0.846034  0.087069  0.329655  0.134828
Morocco             2.416364  1.610000  0.776818  0.010909  0.361818  0.148636
Netherlands         2.738571  1.794286  0.925714  0.058571  0.427143  0.155000
Norway              3.230000  1.510000  1.720000  0.000000  0.690000  0.140000
Palestine           3.090000  2.300000  0.790000  0.050000  0.370000  0.050000
Peru                2.462000  1.260000  1.194000  0.026000  0.480000  0.158000
Poland              2.607500  1.732500  0.840000  0.060000  0.370000  0.150000
Portugal            3.133333  2.103333  1.015000  0.030000  0.345000  0.286667
Russian Federation  2.674000  1.790000  0.846000  0.036000  0.298000  0.108000
Singapore           3.565000  2.485000  1.085000  0.000000  0.615000  0.060000
Spain               2.604250  1.636500  0.931000  0.099750  0.406000  0.163000
Sweden              2.962857  1.934286  1.000000  0.190000  0.384286  0.140000
Switzerland         3.032308  1.784615  1.144615  0.147692  0.468462  0.145385
Syria               3.570000  2.570000  1.000000  0.140000  0.290000  0.290000
Thailand            2.557143  1.511429  0.922857  0.057143  0.372857  0.048571
Turkey              2.328333  1.535000  0.793333  0.130000  0.420000  0.125000
United Kingdom      3.079412  1.823529  1.206471  0.077647  0.408824  0.241765
Vietnam             2.860000  1.853333  0.926667  0.068333  0.368333  0.120000
```

[89]: `groupby_con_mean_df_4[['affect','posemo', 'negemo', 'anx', 'anger', 'sad']]`

[89]:

	affect	posemo	negemo	anx	anger	sad
Country						
Afghanistan	2.940000	1.590000	1.350000	0.000000	0.430000	0.140000
Argentina	1.600000	0.860000	0.740000	0.040000	0.350000	0.040000
Armenia	3.280000	1.800000	1.480000	0.050000	0.760000	0.180000
Austria	2.810833	1.855833	0.956667	0.012500	0.585000	0.274167
Barbados	2.920000	1.020000	1.750000	0.290000	0.440000	0.000000
Belgium	2.187143	1.200000	0.984286	0.230000	0.405714	0.057143
Bermuda	2.775000	1.305000	1.470000	0.150000	0.230000	0.120000
Brazil	2.767778	1.716667	1.013333	0.087778	0.233333	0.237778
Bulgaria	1.610000	1.070000	0.540000	0.090000	0.090000	0.090000
Burma	2.040000	0.990000	1.050000	0.050000	0.680000	0.260000

Canada	2.911538	1.883077	1.023077	0.181538	0.341538	0.160769
China	2.635078	1.560156	1.043281	0.049766	0.481250	0.196094
Denmark	3.295000	1.862500	1.370000	0.140000	0.402500	0.297500
Egypt	2.270000	1.510000	0.730833	0.065833	0.330000	0.044167
Estonia	2.780000	2.110000	0.670000	0.000000	0.440000	0.000000
France	2.739415	1.757415	0.928062	0.086862	0.365077	0.143200
Georgia	2.493333	1.416667	0.966667	0.090000	0.393333	0.043333
Germany	2.295714	1.312857	0.982857	0.092857	0.534286	0.195714
Greece	2.128387	1.460323	0.653871	0.069355	0.220323	0.173226
Hungary	2.382500	1.687500	0.695000	0.055000	0.220000	0.075000
India	2.718000	1.474000	1.182400	0.052000	0.644000	0.184800
Indonesia	3.265000	1.345000	1.925000	0.030000	1.015000	0.075000
Ireland	3.080000	2.024000	1.044000	0.100000	0.448000	0.148000
Israel	2.150000	1.210000	0.930000	0.090000	0.470000	0.190000
Italy	2.634868	1.678465	0.923816	0.087325	0.358465	0.176316
Jamaica	2.580000	1.350000	1.200000	0.070000	0.670000	0.150000
Japan	2.291071	1.596071	0.636786	0.069286	0.279643	0.110357
Jersey	2.957500	1.933750	1.016250	0.042500	0.577500	0.257500
Latvia	2.350000	1.200000	1.150000	0.000000	0.350000	0.200000
Lebanon	3.223333	2.590000	0.616667	0.156667	0.173333	0.073333
Luxembourg	2.420000	1.800000	0.630000	0.000000	0.290000	0.080000
Malaysia	2.945000	1.515000	1.335000	0.210000	0.525000	0.060000
Martinique	2.970000	1.340000	1.630000	0.150000	0.890000	0.070000
Mexico	2.617414	1.745690	0.846034	0.087069	0.329655	0.134828
Morocco	2.416364	1.610000	0.776818	0.010909	0.361818	0.148636
Netherlands	2.738571	1.794286	0.925714	0.058571	0.427143	0.155000
Norway	3.230000	1.510000	1.720000	0.000000	0.690000	0.140000
Palestine	3.090000	2.300000	0.790000	0.050000	0.370000	0.050000
Peru	2.462000	1.260000	1.194000	0.026000	0.480000	0.158000
Poland	2.607500	1.732500	0.840000	0.060000	0.370000	0.150000
Portugal	3.133333	2.103333	1.015000	0.030000	0.345000	0.286667
Russian Federation	2.674000	1.790000	0.846000	0.036000	0.298000	0.108000
Singapore	3.565000	2.485000	1.085000	0.000000	0.615000	0.060000
Spain	2.604250	1.636500	0.931000	0.099750	0.406000	0.163000
Sweden	2.962857	1.934286	1.000000	0.190000	0.384286	0.140000
Switzerland	3.032308	1.784615	1.144615	0.147692	0.468462	0.145385
Syria	3.570000	2.570000	1.000000	0.140000	0.290000	0.290000
Thailand	2.557143	1.511429	0.922857	0.057143	0.372857	0.048571
Turkey	2.328333	1.535000	0.793333	0.130000	0.420000	0.125000
United Kingdom	3.079412	1.823529	1.206471	0.077647	0.408824	0.241765
Vietnam	2.860000	1.853333	0.926667	0.068333	0.368333	0.120000

4.4.4 Compare negative emotions for each country

```
[90]: plt.rcParams["figure.figsize"] = (5,17)
      groupby_coun_mean_df_4[['anx','anger','sad']].plot.barh()
```
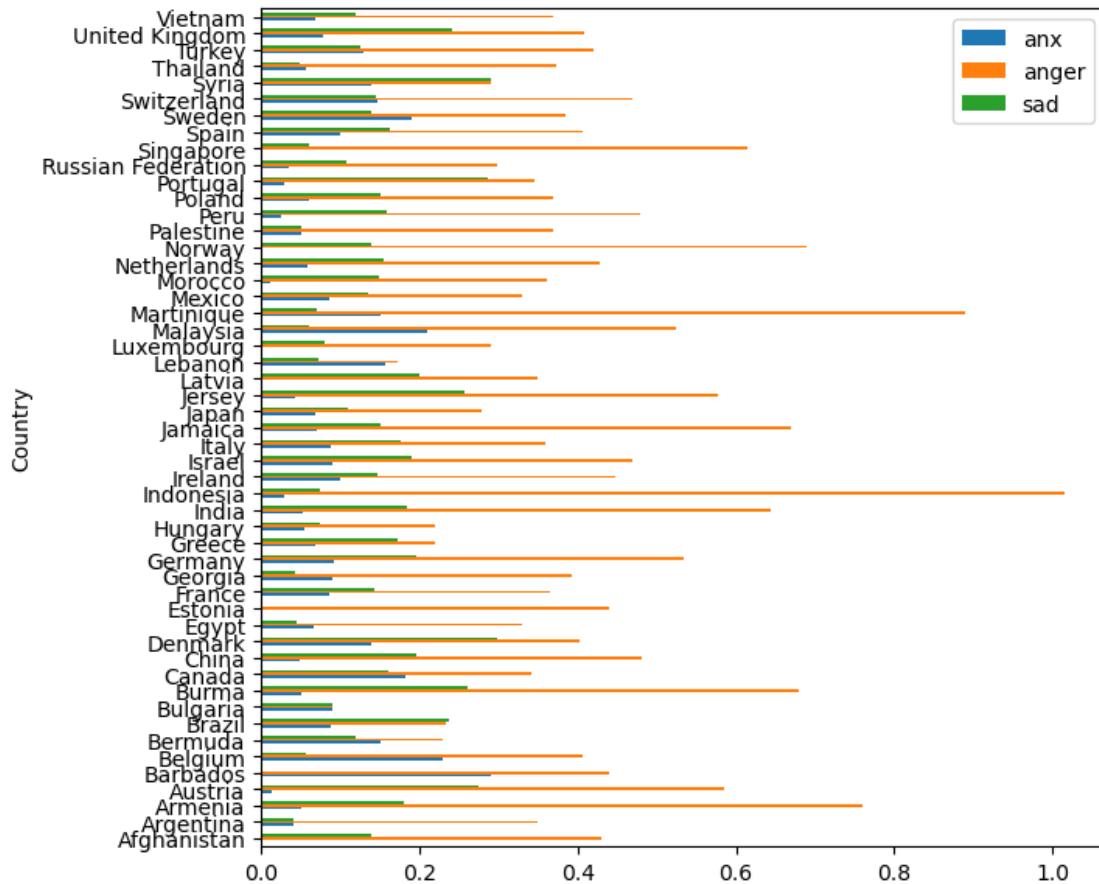
```
[90]: <Axes: ylabel='Country'>
```

97
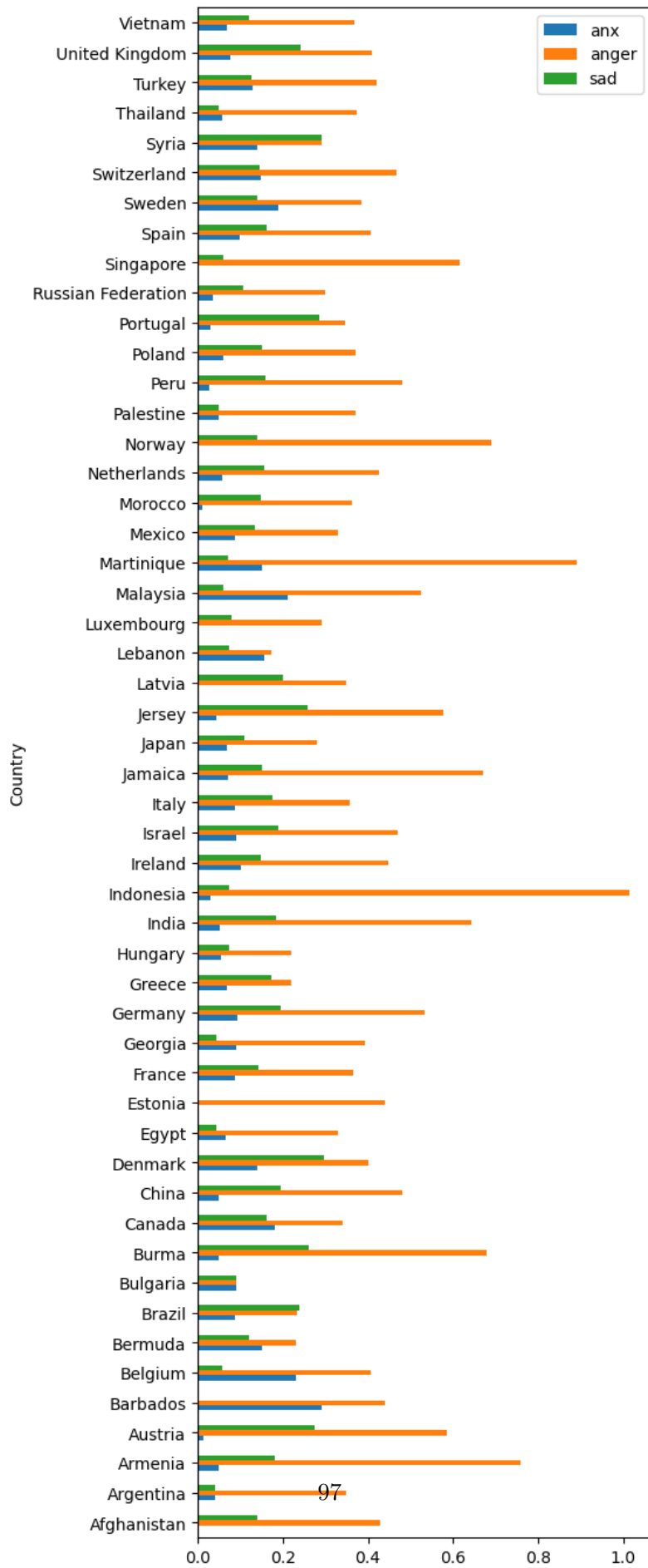
4.4.5 Compare negative emotions for each continent

```
[91]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_4[['anx','anger','sad']].plot.barh()
```
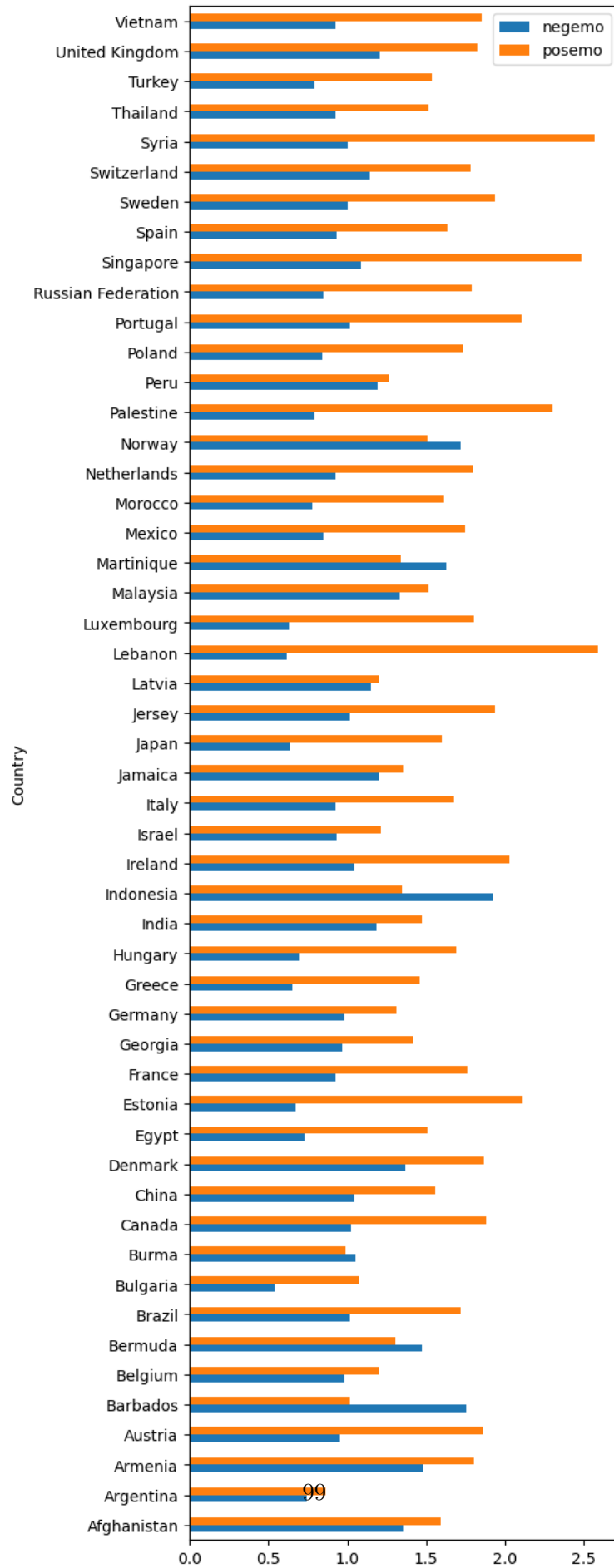
```
[91]: <Axes: ylabel='Country'>
```


4.4.6 Compare positive end negative emotions in each country

```
[92]: plt.rcParams["figure.figsize"] = (5,18)
      groupby_coun_mean_df_4[['negemo','posemo']].plot.barh()
```

```
[92]: <Axes: ylabel='Country'>
```

4.4.7 Compare positive end negative emotions in each continent

```
[93]: plt.rcParams["figure.figsize"] = (7,7)
      groupby_con_mean_df_4[['negemo','posemo']].plot.barh()
```

```
[93]: <Axes: ylabel='Country'>
```