9 Cleaning / Normalizing the thematic area

In [1]:

```
import pandas as pd
pd.options.display.max_colwidth = 400
```

In [2]:

```
%matplotlib inline
```

9.1 Loading the dataset

In [3]:

```
journals = pd.read_csv("tabs_network/journals.csv")
journals.columns
```

Out [3]:

```
Index(['extraction date', 'study unit', 'collection', 'ISSN SciELO', 'ISSN's',
       'title at SciELO', 'title thematic areas',
       'title is agricultural sciences', 'title is applied social sciences',
       'title is biological sciences', 'title is engineering',
       'title is exact and earth sciences', 'title is health sciences',
       'title is human sciences', 'title is linguistics, letters and arts',
       'title is multidisciplinary', 'title current status',
       'title + subtitle SciELO', 'short title SciELO', 'short title ISO',
       'title PubMed', 'publisher name', 'use license', 'alpha frequency',
       'numeric frequency (in months)', 'inclusion year at SciELO',
       'stopping year at SciELO', 'stopping reason',
       'date of the first document', 'volume of the first document',
       'issue of the first document', 'date of the last document',
       'volume of the last document', 'issue of the last document',
       'total of issues', 'issues at 2018', 'issues at 2017', 'issues at 2016',
       'issues at 2015', 'issues at 2014', 'issues at 2013',
       'total of regular issues', 'regular issues at 2018',
       'regular issues at 2017', 'regular issues at 2016',
       'regular issues at 2015', 'regular issues at 2014',
       'regular issues at 2013', 'total of documents', 'documents at 2018',
       'documents at 2017', 'documents at 2016', 'documents at 2015',
       'documents at 2014', 'documents at 2013', 'citable documents',
       'citable documents at 2018', 'citable documents at 2017',
       'citable documents at 2016', 'citable documents at 2015',
       'citable documents at 2014', 'citable documents at 2013',
       'portuguese documents at 2018 ', 'portuguese documents at 2017 ',
       'portuguese documents at 2016 ', 'portuguese documents at 2015 ',
       'portuguese documents at 2014 ', 'portuguese documents at 2013 ',
       'spanish documents at 2018 ', 'spanish documents at 2017 ',
       'spanish documents at 2016 ', 'spanish documents at 2015 ',
       'spanish documents at 2014 ', 'spanish documents at 2013 ',
       'english documents at 2018 ', 'english documents at 2017 ',
       'english documents at 2016 ', 'english documents at 2015 ',
       'english documents at 2014 ', 'english documents at 2013 ',
       'other language documents at 2018 ',
       'other language documents at 2017 ',
       'other language documents at 2016 ',
       'other language documents at 2015 ',
       'other language documents at 2014 ',
       'other language documents at 2013 ', 'google scholar h5 2018 ',
       'google scholar h5 2017 ', 'google scholar h5 2016 ',
       'google scholar h5 2015 ', 'google scholar h5 2014 ',
       'google scholar h5 2013 ', 'google scholar m5 2018 ',
       'google scholar m5 2017 ', 'google scholar m5 2016 ',
       'google scholar m5 2015 ', 'google scholar m5 2014 ',
       'google scholar m5 2013 '],
      dtype='object')
```

The column names aren't helping us with all the small details like the trailing whitespaces in the latter fields. The easiest approach to deal with them is to run this normalization function from the column names simplification notebook. Applying it is straightforward, and the order of the columns is kept as is.

In [4]:

```
def normalize_column_title(name):
    import re
    name_unbracketed = re.sub(r".*\((.*)\)", r"\1",
                              name.replace("(in months)", "in_months"))
    words = re.sub("[^a-z0-9+_ ]", "", name_unbracketed.lower()).split()
    ignored_words = ("at", "the", "of", "and", "google", "scholar", "+")
    replacements = {
        "document": "doc",
        "documents": "docs",
        "frequency": "freq",
        "language": "lang",
    }
    return "_".join(replacements.get(word, word)
                    for word in words if word not in ignored_words) \
              .replace("title_is", "is")
```

In [5]:

```
journals.rename(columns=normalize_column_title, inplace=True)
journals.columns
```

Out [5]:

```
Index(['extraction_date', 'study_unit', 'collection', 'issn_scielo', 'issns',
       'title_scielo', 'title_thematic_areas', 'is_agricultural_sciences',
       'is_applied_social_sciences', 'is_biological_sciences',
       'is_engineering', 'is_exact_earth_sciences', 'is_health_sciences',
       'is_human_sciences', 'is_linguistics_letters_arts',
       'is_multidisciplinary', 'title_current_status', 'title_subtitle_scielo',
       'short_title_scielo', 'short_iso', 'title_pubmed', 'publisher_name',
       'use_license', 'alpha_freq', 'numeric_freq_in_months',
       'inclusion_year_scielo', 'stopping_year_scielo', 'stopping_reason',
       'date_first_doc', 'volume_first_doc', 'issue_first_doc',
       'date_last_doc', 'volume_last_doc', 'issue_last_doc', 'total_issues',
       'issues_2018', 'issues_2017', 'issues_2016', 'issues_2015',
       'issues_2014', 'issues_2013', 'total_regular_issues',
       'regular_issues_2018', 'regular_issues_2017', 'regular_issues_2016',
       'regular_issues_2015', 'regular_issues_2014', 'regular_issues_2013',
       'total_docs', 'docs_2018', 'docs_2017', 'docs_2016', 'docs_2015',
       'docs_2014', 'docs_2013', 'citable_docs', 'citable_docs_2018',
       'citable_docs_2017', 'citable_docs_2016', 'citable_docs_2015',
       'citable_docs_2014', 'citable_docs_2013', 'portuguese_docs_2018',
       'portuguese_docs_2017', 'portuguese_docs_2016', 'portuguese_docs_2015',
       'portuguese_docs_2014', 'portuguese_docs_2013', 'spanish_docs_2018',
       'spanish_docs_2017', 'spanish_docs_2016', 'spanish_docs_2015',
       'spanish_docs_2014', 'spanish_docs_2013', 'english_docs_2018',
       'english_docs_2017', 'english_docs_2016', 'english_docs_2015',
       'english_docs_2014', 'english_docs_2013', 'other_lang_docs_2018',
       'other_lang_docs_2017', 'other_lang_docs_2016', 'other_lang_docs_2015',
       'other_lang_docs_2014', 'other_lang_docs_2013', 'h5_2018', 'h5_2017',
       'h5_2016', 'h5_2015', 'h5_2014', 'h5_2013', 'm5_2018', 'm5_2017',
       'm5_2016', 'm5_2015', 'm5_2014', 'm5_2013'],
    dtype='object')
```

9.2 Thematic areas

At first, it might seem that there are way too many thematic areas:

In [6]:
```
journals["title_thematic_areas"].unique()
```

Out [6]:
```
array(['Applied Social Sciences', 'Health Sciences', 'Human Sciences',
       'Exact and Earth Sciences', 'Biological Sciences',
       'Agricultural Sciences',
       'Biological Sciences;Exact and Earth Sciences',
       'Engineering;Exact and Earth Sciences',
       'Agricultural Sciences;Biological Sciences',
       'Applied Social Sciences;Human Sciences', 'Engineering',
       'Health Sciences;Human Sciences',
       'Agricultural Sciences;Biological Sciences;Exact and Earth Sciences;Health
Sciences',
       'Linguistics, Letters and Arts',
       'Biological Sciences;Health Sciences',
       'Agricultural Sciences;Biological Sciences;Health Sciences',
       'Agricultural Sciences;Biological Sciences;Engineering;Exact and Earth
Sciences;Health Sciences;Human Sciences',
       'Agricultural Sciences;Biological Sciences;Engineering;Exact and Earth
Sciences;Human Sciences',
       'Agricultural Sciences;Biological Sciences;Engineering;Health Sciences',
       'Applied Social Sciences;Biological Sciences;Human Sciences',
       'Human Sciences;Linguistics, Letters and Arts',
       'Applied Social Sciences;Linguistics, Letters and Arts',
       'Biological Sciences;Human Sciences',
       'Agricultural Sciences;Engineering',
       'Applied Social Sciences;Exact and Earth Sciences',
       'Applied Social Sciences;Human Sciences;Linguistics, Letters and Arts',
       'Agricultural Sciences;Biological Sciences;Engineering',
       'Agricultural Sciences;Biological Sciences;Engineering;Exact and Earth
Sciences',
       'Applied Social Sciences;Engineering',
       'Applied Social Sciences;Biological Sciences;Health Sciences;Human Sciences',
       'Applied Social Sciences;Exact and Earth Sciences;Human Sciences',
       'Applied Social Sciences;Biological Sciences;Engineering;Exact and Earth
Sciences',
       'Applied Social Sciences;Health Sciences',
       'Biological Sciences;Engineering;Exact and Earth Sciences',
       'Agricultural Sciences;Applied Social Sciences',
       'Agricultural Sciences;Applied Social Sciences;Biological Sciences;Health
Sciences;Human Sciences',
       'Agricultural Sciences;Biological Sciences;Engineering;Exact and Earth
Sciences;Health Sciences;Human Sciences;Linguistics, Letters and Arts',
       'Agricultural Sciences;Applied Social Sciences;Health Sciences',
       'Biological Sciences;Engineering;Health Sciences',
       'Agricultural Sciences;Applied Social Sciences;Exact and Earth Sciences;Health
Sciences;Human Sciences;Linguistics, Letters and Arts',
       'Applied Social Sciences;Health Sciences;Human Sciences',
       'Biological Sciences;Human Sciences;Linguistics, Letters and Arts',
       'Linguistics, Letters and Arts;Applied Social Sciences;Human Sciences',
       'Linguistics, Letters and Arts;Human Sciences',
       'Agricultural Sciences;Exact and Earth Sciences',
       'Agricultural Sciences;Applied Social Sciences;Human Sciences',
       'Agricultural Sciences;Biological Sciences;Exact and Earth Sciences',
       'Linguistics, Letters and Arts;Applied Social Sciences',
       'Agricultural Sciences;Applied Social Sciences;Biological
Sciences;Engineering;Exact and Earth Sciences;Health Sciences;Human Sciences',
       'Applied Social Sciences;Biological Sciences;Engineering',
       'Applied Social Sciences;Biological Sciences;Exact and Earth Sciences;Health
Sciences',
       nan, 'Psicanalise', 'Human Sciences;Applied Social Sciences',
       'Applied Social Sciences;Engineering;Linguistics, Letters and Arts',
       'Agricultural Sciences;Biological Sciences;Engineering;Exact and Earth
Sciences;Health Sciences',
       'Biological Sciences;Engineering;Exact and Earth Sciences;Health Sciences',
       'Exact and Earth Sciences;Human Sciences',
       'Agricultural Sciences;Applied Social Sciences;Biological
Sciences;Engineering;Exact and Earth Sciences;Health Sciences;Human
Sciences;Linguistics, Letters and Arts'],
      dtype=object)
```

But, actually, there are just 8 of them, and what we're seeing are the several combinations of them:

In [7]:
```
set.union(*journals["title_thematic_areas"].str.split(";")
                                           .dropna().apply(set).values)
```

Out [7]:
```
{'Agricultural Sciences',
 'Applied Social Sciences',
 'Biological Sciences',
 'Engineering',
 'Exact and Earth Sciences',
 'Health Sciences',
 'Human Sciences',
 'Linguistics, Letters and Arts',
 'Psicanalise'}
```

The `Psicanalise` isn't a thematic area, it appears in the `psi` collection, which is independent (i.e., it's in the SciELO network but it's not maintained by SciELO, and its requirements regarding some fields aren't the same of other collections).

Actually, we don't need to worry so much about this column in this normalization step since this information is split in the several `title is ...` columns, which had been renamed here to:

In [8]:
```
areas_map = {
    "Agricultural Sciences": "is_agricultural_sciences",
    "Applied Social Sciences": "is_applied_social_sciences",
    "Biological Sciences": "is_biological_sciences",
    "Engineering": "is_engineering",
    "Exact and Earth Sciences": "is_exact_earth_sciences",
    "Health Sciences": "is_health_sciences",
    "Human Sciences": "is_human_sciences",
    "Linguistics, Letters and Arts": "is_linguistics_letters_arts",
}
areas = list(areas_map.values())
```

9.3 Multidisciplinary

Actually, `is_multidisciplinary` isn't a thematic area by itself, but it might be useful, and its meaning can be promptly checked:

In [9]:

```
(
    (journals[areas].sum(axis=1) >= 3)
    != journals["is_multidisciplinary"].apply(bool)
).sum()
```

Out [9]:

```
0
```

We have `is_multidisciplinary == 1` if and only if the journal have at least 3 areas.

9.4 Consistency between text and flags

Does the `title_thematic_areas` text match the data in the single-area `is_*` columns?

In [10]:

```
tta_sets = (
    journals["title_thematic_areas"]
    .fillna("")
    .str.split(";")
    .apply(lambda x: {areas_map[area] for area in x
                                      if area in areas_map})
)
pd.concat([
    journals[area]
    != tta_sets.apply((lambda a: lambda x: int(a in x))(area))
    for area in areas
], axis=1).any()
```

Out [10]:

```
0    False
1    False
2    False
3    False
4    False
5    False
6    False
7    False
dtype: bool
```

Yes, it does, as long as we're ignoring the already seen `Psicanalise` value.

9.5 Emptiness

Are there entries without any thematic area?

In [11]:

```
journals[journals[areas].sum(axis=1) == 0] \
        [["issn_scielo", "collection", "title_scielo", "title_thematic_areas"]]
```

Out [11]:

	issn_scielo	collection	title_scielo	title_thematic_areas
1350	0104-3269	psi	Mudanças	NaN
1351	1516-1854	psi	Interação	NaN
1352	1679-074X	psi	Psicanalítica	NaN
1353	1809-8894	psi	Mnemosine	NaN
1354	1413-0556	psi	Psicanálise e Universidade	Psicanalise
1355	1413-4063	psi	Psicologia Revista	NaN
1356	1806-6631	psi	Família e Comunidade	NaN
1357	0102-7182	psi	Psicologia & Sociedade	NaN

Continued on next page

	issn_scielo	collection	title_scielo	title_thematic_areas
1358	1982-5471	psi	Mosaico	NaN
1359	0103-863X	psi	Paidéia (Ribeirão Preto)	NaN
1360	0124-4906	psi	Informes Psicológicos	NaN
1362	0104-8023	psi	Revista do Departamento de Psicologia. UFF	Psicanalise
1363	1516-1498	psi	Ágora: Estudos em Teoria Psicanalítica	Psicanalise
1364	1415-4714	psi	Revista Latinoamericana de Psicopatologia Fund...	NaN
1365	1516-2567	psi	Revista Kairós	NaN
1366	1676-5478	psi	Encontro	Psicanalise
1367	1516-8530	psi	Revista Brasileira de Psicoterapia	Psicanalise
1368	1983-3288	psi	Psychology & Neuroscience	NaN
1371	0102-7972	psi	Psicologia: Reflexão e Crítica	NaN
1396	1981-9145	psi	Revista Brasileira de Psicologia do Esporte	NaN
1400	0257-4322	psi	Revista Cubana de Psicología	NaN
1406	1983-0769	psi	Revista Estudos Lacanianos	NaN
1407	1657-9267	psi	Universitas Psychologica	NaN
1408	0121-4381	psi	Suma Psicológica	NaN
1425	0102-762X	psi	Distúrbios da Comunicação	NaN

That includes every entry with the unnormalized `Psicanalise` value as the thematic area, which will be regarded here as invalid.

In [12]:

```
journals[journals["title_thematic_areas"] == "Psicanalise"].shape
```

Out [12]:

```
(5, 98)
```

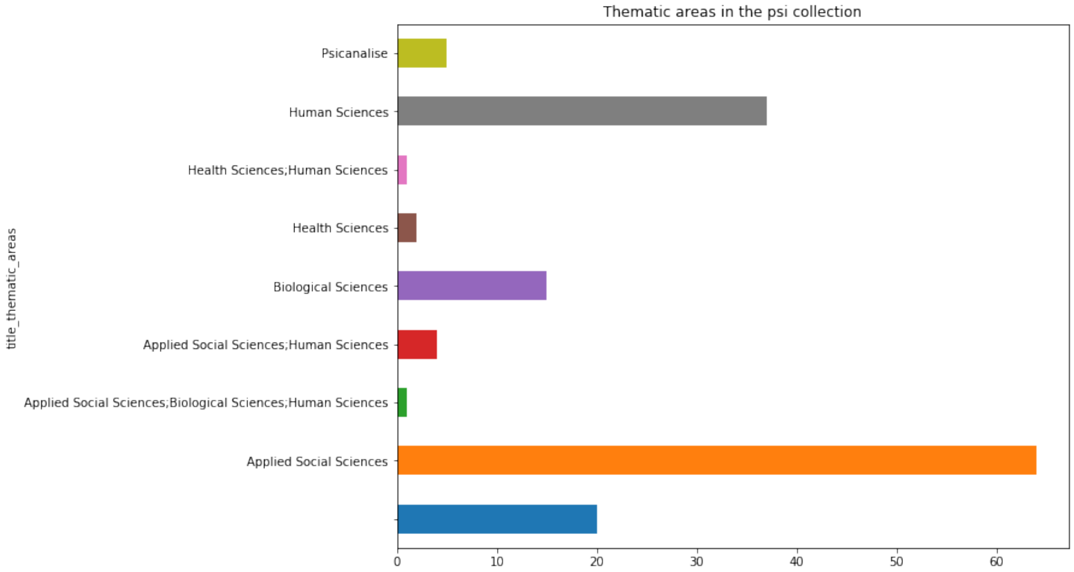
That's consistent, and all empty/invalid entries are from the `psi` collection. We could in some sense fix, but there are more than a single valid thematic area in that collection:

In [13]:

```
psi_areas = journals[journals["collection"] == "psi"].fillna("") \
                    .groupby("title_thematic_areas").size()
psi_areas.plot.barh(figsize=(10, 8),
                    title="Thematic areas in the psi collection")
psi_areas
```

Out [13]:

```
title_thematic_areas
                                                              20
Applied Social Sciences                                       64
Applied Social Sciences;Biological Sciences;Human Sciences     1
Applied Social Sciences;Human Sciences                         4
Biological Sciences                                           15
Health Sciences                                                2
Health Sciences;Human Sciences                                 1
Human Sciences                                                37
Psicanalise                                                    5
dtype: int64
```



The most common classification as `Applied Social Sciences`, but psychology is instead rooted as `Human Sciences` in the Lattes knowledge tree[1] (there's also a full PDF version of it[2] in CNPq, but both are in Brazilian Portuguese), which should be seen as a default/fallback for these empty/invalid entries.

9.6 Consistency within the ISSN

We'll need the ISSN, so let's normalize it by applying the snippet from the ISSN normalization notebook:

In [14]:

```
issn_scielo_fix = {"0001-6002": "0001-6012",
                   "0258-6444": "2215-3535",
                   "0325-8203": "1668-7027",
                   "0719-448x": "0719-448X",
                   "0797-9789": "1688-499X",
                   "0807-8967": "0870-8967",
                   "0858-6444": "0258-6444",
                   "1315-5216": "1316-5216",
                   "1667-8682": "1667-8982",
                   "1678-5177": "0103-6564",
                   "1683-0789": "1683-0768",
                   "1688-4094": "1688-4221",
                   "1852-4418": "1852-4184",
                   "1980-5438": "0103-5665",
                   "2175-3598": "0104-1282",
                   "2233-7666": "2223-7666",
                   "2237-101X": "1518-3319",
                   "24516600": "2451-6600",
                   "2993-6797": "2393-6797"}
journals["issn_scielo"].replace(issn_scielo_fix, inplace=True)
```

Each journal might have more than one row, since it might appear in more than one collection, but there might be some inconsistency going on, as well. Repeated rows aren't a big issue, but every inconsistent duplication needs to be fixed. Which ISSNs are inconsistent? That is, which ISSNs are assigned to distinct thematic areas in distinct rows?

[1] http://lattes.cnpq.br/web/dgp/arvore-do-conhecimento
[2] http://www.cnpq.br/documents/10157/186158/TabeladeAreasdoConhecimento.pdf

In [15]:

```
areas_inconsistency = journals[journals[areas].sum(axis=1) != 0] \
                          [["issn_scielo"] + areas] \
    .groupby("issn_scielo") \
    .apply(lambda df: df.apply(lambda col: set(col.dropna()))
                        .apply(len).max() > 1)
areas_inconsistency_index = areas_inconsistency[areas_inconsistency].index
areas_inconsistency_index
```

Out [15]:

```
Index(['0011-5258', '0100-512X', '0100-8587', '0101-3300', '0101-9074',
       '0102-6909', '0103-2070', '0103-5665', '0104-026X', '0104-4478',
       '0104-7183', '0104-8333', '0104-9313', '0120-0534', '0254-9247',
       '0717-7194', '0718-6924', '1012-1587', '1413-294X', '1413-8271',
       '1414-3283', '1414-753X', '1414-9893', '1517-4522', '1518-3319',
       '1688-4221', '1688-499X', '1794-9998', '1806-6445', '1806-6976',
       '1981-3821', '2215-3535'],
      dtype='object', name='issn_scielo')
```

In [16]:

```
pd.DataFrame(
    journals[journals["issn_scielo"].isin(areas_inconsistency_index)]
        .groupby("issn_scielo")
        .apply(lambda df: {k: v for k, v in df[areas].apply(set)
                                                  .to_dict().items()
                           if len(v) > 1})
        .apply(sorted) # Casts from dictionary (keys) to list
        .rename("inconsistency")
)
```

Out [16]:

	inconsistency
issn_scielo	
0011-5258	[is_applied_social_sciences, is_human_sciences]
0100-512X	[is_applied_social_sciences]
0100-8587	[is_applied_social_sciences]
0101-3300	[is_applied_social_sciences]
0101-9074	[is_applied_social_sciences, is_human_sciences]
0102-6909	[is_applied_social_sciences, is_human_sciences]
0103-2070	[is_applied_social_sciences, is_human_sciences]
0103-5665	[is_applied_social_sciences, is_human_sciences]
0104-026X	[is_applied_social_sciences]
0104-4478	[is_applied_social_sciences, is_human_sciences]
0104-7183	[is_applied_social_sciences, is_human_sciences]
0104-8333	[is_applied_social_sciences]
0104-9313	[is_applied_social_sciences]
0120-0534	[is_biological_sciences, is_human_sciences]
0254-9247	[is_applied_social_sciences, is_human_sciences]
0717-7194	[is_human_sciences]
0718-6924	[is_applied_social_sciences, is_human_sciences]
1012-1587	[is_linguistics_letters_arts]
1413-294X	[is_applied_social_sciences]
1413-8271	[is_applied_social_sciences, is_human_sciences]
1414-3283	[is_applied_social_sciences, is_health_science...
1414-753X	[is_biological_sciences]
1414-9893	[is_applied_social_sciences, is_human_sciences]
1517-4522	[is_applied_social_sciences, is_human_sciences]
1518-3319	[is_applied_social_sciences, is_human_sciences]
1688-4221	[is_applied_social_sciences]

Continued on next page

	inconsistency
issn_scielo	
1688-499X	[is_human_sciences]
1794-9998	[is_applied_social_sciences, is_human_sciences]
1806-6445	[is_human_sciences]
1806-6976	[is_applied_social_sciences, is_health_sciences]
1981-3821	[is_applied_social_sciences, is_human_sciences]
2215-3535	[is_health_sciences]

There seems to be way too many inconsistencies, but let's simply remove the empty entries before checking this.

In [17]:

```
inconsistencies_df = pd.DataFrame(
    journals[journals["issn_scielo"].isin(areas_inconsistency_index) &
             journals[areas].sum(axis=1)]
        .groupby("issn_scielo")
        .apply(lambda df: sorted(k for k, v in df[areas].apply(set)
                                                        .to_dict().items()
                                   if len(v) > 1)
                          or None)
        .dropna()
        .rename("inconsistency")
)
inconsistencies_df
```

Out [17]:

	inconsistency
issn_scielo	
0011-5258	[is_applied_social_sciences, is_human_sciences]
0101-9074	[is_applied_social_sciences, is_human_sciences]
0102-6909	[is_applied_social_sciences, is_human_sciences]
0103-2070	[is_applied_social_sciences, is_human_sciences]
0103-5665	[is_applied_social_sciences, is_human_sciences]
0104-4478	[is_applied_social_sciences, is_human_sciences]
0104-7183	[is_applied_social_sciences, is_human_sciences]
0120-0534	[is_biological_sciences, is_human_sciences]
0254-9247	[is_applied_social_sciences, is_human_sciences]
0718-6924	[is_applied_social_sciences, is_human_sciences]
1413-8271	[is_applied_social_sciences, is_human_sciences]
1414-9893	[is_applied_social_sciences, is_human_sciences]
1517-4522	[is_applied_social_sciences, is_human_sciences]
1518-3319	[is_applied_social_sciences, is_human_sciences]
1794-9998	[is_applied_social_sciences, is_human_sciences]
1806-6976	[is_applied_social_sciences, is_health_sciences]
1981-3821	[is_applied_social_sciences, is_human_sciences]

In [18]:

```
inconsistent_rows = (
    journals
        [journals["issn_scielo"].isin(inconsistencies_df.index)]
        [["issn_scielo", "collection",
          "title_thematic_areas", "title_current_status"]]
        .sort_values(by=["issn_scielo", "collection"])
)
inconsistent_rows.set_index(["issn_scielo", "collection"])
```

Out [18]:

		title_thematic_areas	title_current_status
issn_scielo	collection		
0011-5258	scl	Human Sciences	current
0011-5258	sss	Applied Social Sciences	current
0101-9074	scl	Human Sciences	current
0101-9074	sss	Applied Social Sciences	current
0102-6909	scl	Human Sciences	current
0102-6909	sss	Applied Social Sciences	current
0103-2070	scl	Human Sciences	current
0103-2070	sss	Applied Social Sciences	current
0103-5665	psi	Applied Social Sciences	deceased
0103-5665	psi	Applied Social Sciences	current
0103-5665	scl	Human Sciences	suspended
0104-4478	scl	Human Sciences	current
0104-4478	sss	Applied Social Sciences	current
0104-7183	scl	Human Sciences	current
0104-7183	sss	Applied Social Sciences	current
0120-0534	col	Human Sciences	current
0120-0534	psi	Biological Sciences	suspended
0254-9247	per	Human Sciences	current
0254-9247	psi	Applied Social Sciences	current
0718-6924	chl	Human Sciences	current
0718-6924	psi	Applied Social Sciences	suspended
1413-8271	psi	Applied Social Sciences	suspended
1413-8271	scl	Human Sciences	current
1414-9893	psi	Applied Social Sciences	suspended
1414-9893	scl	Human Sciences	current
1517-4522	scl	Human Sciences	current
1517-4522	sss	Applied Social Sciences	current
1518-3319	scl	Human Sciences	current
1518-3319	sss	Applied Social Sciences	current
1794-9998	col	Human Sciences	current
1794-9998	psi	Applied Social Sciences	suspended
1806-6976	psi	Applied Social Sciences	current
1806-6976	rve	Health Sciences	suspended
1981-3821	scl	Human Sciences	current
1981-3821	sss	Applied Social Sciences	current

In [19]:

```
inconsistent_rows.groupby("issn_scielo")["collection"] \
    .apply(set).value_counts()
```

Out [19]:

```
{sss, scl}    9
{scl, psi}    3
{col, psi}    2
{psi, per}    1
{chl, psi}    1
{rve, psi}    1
Name: collection, dtype: int64
```

The above show that, internal to each collection, the thematic area is always consistent in the 2018-09-14 reports. However, distinct collections sometimes classify some journals differently. Most entries regarding this issue are from both the now discontinued `sss` collection (Social Sciences) and the `scl` collection (Brazil), in these cases we should stick with the value given by the `scl` collection, since it's probably the updated value. The entries with both `psi` and `scl` have the journal either `suspended` or `deceased` in `psi`, so we should, also, use the value in the `scl` entry. The same happen in the pairs `col-psi` and `chl-psi`.

There’s a single entry active in both `psi` and `per`, but since psychology belongs to the `Human Sciences` area (as seem in the *Emptiness* section of this notebook), we should take care when a psychology collection entry is regarded as `Applied Social Sciences`. Actually, we should use the thematic area classification as in the `per` collection, as the journal clearly regards to psychology:

In [20]:

```
journals[journals["issn_scielo"] == "0254-9247"][[
    "collection", "title_thematic_areas", "title_current_status",
    "title_scielo", "title_subtitle_scielo", "short_title_scielo",
    "title_pubmed", "publisher_name", "short_iso"]].T
```

Out [20]:

	1262	1378
collection	per	psi
title_thematic_areas	Human Sciences	Applied Social Sciences
title_current_status	current	current
title_scielo	Revista de Psicología (PUCP)	Revista de Psicología (Lima)
title_subtitle_scielo	Revista de Psicología (PUCP)	Revista de Psicología (Lima)
short_title_scielo	Revista de Psicología	Rev. psicol. (Lima)
title_pubmed	NaN	NaN
publisher_name	Pontificia Universidad Católica del Perú	Pontificia Universidad Católica del Perú. Depa...
short_iso	Revista de Psicología	Rev. psicol. (Lima)

The only pair missing is the one regarding two thematic collections:

In [21]:

```
journals[journals["issn_scielo"] == "1806-6976"][[
    "collection", "title_thematic_areas", "title_current_status",
    "title_scielo", "title_subtitle_scielo", "short_title_scielo",
    "title_pubmed", "publisher_name", "short_iso"]].T
```

Out [21]:

	1453	1499
collection	psi	rve
title_thematic_areas	Applied Social Sciences	Health Sciences
title_current_status	current	suspended
title_scielo	SMAD. Revista eletrônica saúde mental álcool e...	SMAD. Revista eletrônica saúde mental álcool e...
title_subtitle_scielo	SMAD. Revista eletrônica saúde mental álcool e...	SMAD. Revista eletrônica saúde mental álcool e...
short_title_scielo	SMAD, Rev. Eletrônica Saúde Mental Álcool Drog...	SMAD, Rev. Eletrônica Saúde Mental Álcool Drog...
title_pubmed	NaN	NaN
publisher_name	Universidade de São Paulo, Escola de Enfermage...	USP/EERP
short_iso	SMAD, Rev. Eletrônica Saúde Mental Álcool Drog...	SMAD, Rev. Eletrônica Saúde Mental Álcool Drog...

As the journal title translated to English means something like `Mental health, alcohol and drugs e-journal`, it’s pretty hard to know if it’s more about psychology or some health science, despite the fact that the name might be misleading, but it might be both, and there’s no `Human Sciences` in either alternative.

The easier approach for this normalization is: if the journal has *distinct* thematic areas in different collections, stick with entry in the *certified* and *currently maintained collection*, or in `rve`. That suffices in our case, and it’ll choose exactly the entries as discriminated above.

9.7 Normalizing

The goal is copy the fill the empty data as `Human Sciences`, and use information from a single row when there's more than one with distinct areas, leaving the `sss` and `psi` with lower priority when there's some conflict. That can be done on the `title_thematic_areas` column:

In [22]:

```
tta_map = journals.groupby("issn_scielo").apply(
    lambda df: df.assign(title_thematic_areas=df["title_thematic_areas"]
                                              .replace("Psicanalise",
                                                       "Human Sciences")
                                              .fillna("Human Sciences"),
                         order=df["collection"].isin(["sss", "psi"]) |
                               (df["title_thematic_areas"] == "Psicanalise") |
                               df["title_thematic_areas"].isna())
                 .sort_values("order")["title_thematic_areas"].iloc[0]
)
tta_text_n = journals["issn_scielo"].map(tta_map) \
                                    .rename("title_thematic_areas")
tta_text_n.head()
```

Out [22]:

```
0      Applied Social Sciences
1              Health Sciences
2               Human Sciences
3     Exact and Earth Sciences
4              Health Sciences
Name: title_thematic_areas, dtype: object
```

It can be used to re-build the several flag columns:

In [23]:

```
tta_list_n = tta_text_n.str.split(";")
tta_n = pd.DataFrame(tta_text_n).assign(**{
    area: tta_list_n.apply((lambda n: lambda entries: int(n in entries))(name))
    for name, area in areas_map.items()
}).assign(
    is_multidisciplinary=lambda df: (df[areas].sum(axis=1) >= 3).map(int)
)
tta_n.head().T
```

Out [23]:

	0	1	2	3	4
title_thematic_areas	Applied Social Sciences	Health Sciences	Human Sciences	Exact and Earth Sciences	Health Sciences
is_agricultural_sciences	0	0	0	0	0
is_applied_social_sciences	1	0	0	0	0
is_biological_sciences	0	0	0	0	0
is_engineering	0	0	0	0	0
is_exact_earth_sciences	0	0	0	1	0
is_health_sciences	0	1	0	0	1
is_human_sciences	0	0	1	0	0
is_linguistics_letters_arts	0	0	0	0	0
is_multidisciplinary	0	0	0	0	0

Which can be used to directly normalize the dataset:

In [24]:

```
journals_n = journals.assign(**tta_n)
journals_n.shape
```

Out [24]:
```
(1732, 98)
```

How many empty thematic area entries are there?

In [25]:
```
journals_n[journals_n[areas].sum(axis=1) == 0].shape[0]
```

Out [25]:
```
0
```

Are there any ISSN with inconsistent thematic areas?

In [26]:
```
journals["issn_scielo"].drop_duplicates().shape
```

Out [26]:
```
(1653,)
```

In [27]:
```
journals_n.groupby("issn_scielo")[areas].apply(
    lambda df: len(df.drop_duplicates())
).value_counts()
```

Out [27]:
```
1    1653
dtype: int64
```

All distinct ISSNs in this new `journals_n` have only one set of thematic areas, so it's consistent.

9.8 Summary

A full snippet for thematic area normalization is:

```
areas_map = {
    "Agricultural Sciences": "is_agricultural_sciences",
    "Applied Social Sciences": "is_applied_social_sciences",
    "Biological Sciences": "is_biological_sciences",
    "Engineering": "is_engineering",
    "Exact and Earth Sciences": "is_exact_earth_sciences",
    "Health Sciences": "is_health_sciences",
    "Human Sciences": "is_human_sciences",
    "Linguistics, Letters and Arts": "is_linguistics_letters_arts",
}
areas = list(areas_map.values())

issn_scielo_fix = {"0001-6002": "0001-6012",
                   "0258-6444": "2215-3535",
                   "0325-8203": "1668-7027",
                   "0719-448x": "0719-448X",
                   "0797-9789": "1688-499X",
                   "0807-8967": "0870-8967",
                   "0858-6444": "0258-6444",
                   "1315-5216": "1316-5216",
                   "1667-8682": "1667-8982",
                   "1678-5177": "0103-6564",
                   "1683-0789": "1683-0768",
                   "1688-4094": "1688-4221",
                   "1852-4418": "1852-4184",
                   "1980-5438": "0103-5665",
                   "2175-3598": "0104-1282",
                   "2233-7666": "2223-7666",
                   "2237-101X": "1518-3319",
                   "24516600": "2451-6600",
                   "2993-6797": "2393-6797"}
```

```
def normalize_column_title(name):
    import re
    name_unbracketed = re.sub(r".*\((.*)\)", r"\1",
                              name.replace("(in months)", "in_months"))
    words = re.sub("[^a-z0-9+_ ]", "", name_unbracketed.lower()).split()
    ignored_words = ("at", "the", "of", "and", "google", "scholar", "+")
    replacements = {
        "document": "doc",
        "documents": "docs",
        "frequency": "freq",
        "language": "lang",
    }
    return "_".join(replacements.get(word, word)
                    for word in words if word not in ignored_words) \
              .replace("title_is", "is")

# Load the data
journals = pd.read_csv("tabs_network/journals.csv")

# Column names and ISSN normalization
journals.rename(columns=normalize_column_title, inplace=True)
journals["issn_scielo"].replace(issn_scielo_fix, inplace=True)

# Thematic area normalization
tta_map = journals.groupby("issn_scielo").apply(
    lambda df: df.assign(title_thematic_areas=df["title_thematic_areas"]
                                              .replace("Psicanalise",
                                                       "Human Sciences")
                                              .fillna("Human Sciences"),
                         order=df["collection"].isin(["sss", "psi"]) |
                               (df["title_thematic_areas"] == "Psicanalise") |
                               df["title_thematic_areas"].isna())
                 .sort_values("order")["title_thematic_areas"].iloc[0]
)
tta_text_n = journals["issn_scielo"].map(tta_map) \
                                    .rename("title_thematic_areas")
tta_list_n = tta_text_n.str.split(";")
tta_n = pd.DataFrame(tta_text_n).assign(**{
    area: tta_list_n.apply((lambda n: lambda entries: int(n in entries))(name))
    for name, area in areas_map.items()
}).assign(
    is_multidisciplinary=lambda df: (df[areas].sum(axis=1) >= 3).map(int)
)
journals = journals.assign(**tta_n)
```

It also normalizes the column names and the issn_scielo column (former ISSN SciELO), as these are a requirement in order to normalize the thematic areas.