COMPARISON BETWEEN NUTRITION GRADES OF FOODS SOLD IN SPAIN, FRANCE AND GERMANY.

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ABSTRACT

THE OBJECTIVE OF THIS STUDY IS TO COMPARE THE NUTRITION GRADES (A, B, C, D, E) OF THE FOOD SOLD IN SPAIN, FRANCE AND GERMANY.

THE DATASET USED TO CARRY OUT THE STUDY WAS DOWNLOADED FROM THE OPEN FOOD FACTS WEBSITE "THE FREE FOOD PRODUCTS DATABASE" (HTTPS://WORLD.OPENFACTS.ORG).

THE SCIENTIFIC METHOD WAS USED FOLLOWING EACH OF ITS STAGES OF ACQUISITION, PREPARATION, ANALYSIS, REPORT AND THEN ACTUATIONS TO BE PERFORMED, SEVERAL ITERATIONS WERE MADE AS THE DATA WERE ANALYZED FOR BETTER UNDERSTANDING.

FOUND SIGNIFICANT DATA RELATED TO THE QUALITY OF THE FOOD SOLD IN THE COUNTRIES MENTIONED IN RELATION TO THE NUTRITION GRADES.

MOTIVATION

CURRENTLY THERE IS A GROWING TREND IN THE AMOUNT OF FOOD SOLD IN DIFFERENT COUNTRIES WITH A LOW LEVEL OF NUTRITION AND AT THE SAME TIME HARMFUL TO HEALTH DUE TO THE POOR QUALITY INGREDIENTS THAT FOOD HAS, THIS IS DUE TO THE NEED TO COMPANIES REDUCE COSTS, INCREASE PROFIT MARGINS AND SELL IN MORE QUANTITIES.

SOME COUNTRIES SUCH AS FRANCE WITH INITIATIVES TO IMPROVE THE NUTRITIONAL QUALITY OF THE FOOD SOLD HAVE OPTED TO APPLY A GRADE SYSTEM FROM LETTER "A" TO LETTER "E" TO SIMPLIFY NUTRITION LABELING AND CAN BE EASILY AND FAST UNDERSTOOD BY THE GENERAL PUBLIC.

MOTIVATION

WHERE THE LETTER "A" AND THE GREEN COLOR IS THE CLASSIFICATION WITH THE HIGHEST NUTRITION GRADE (BETTER QUALITY FOOD) AND, ON THE CONTRARY, THE LETTER "E" AND THE RED COLOR INDICATE A LOWER NUTRITION GRADE (FOODS HARMFUL TO HEALTH).

THIS CLASSIFICATION WAS PROPOSED BY PROFESSOR SERGE HERCBERG TO PROMOTE A FRENCH PUBLIC HEALTH AND NUTRITION POLICY WITHIN THE FRAMEWORK OF FRANCE'S NATIONAL HEALTH STRATEGY.

IN THIS STUDY, THE DATA WERE ANALYZED AND COMPARED ACCORDING TO THE NUTRITION SCALE MENTIONED ABOVE FOR THE COUNTRIES OF FRANCE, SPAIN AND GERMANY.

DATASET(S)

THE DATASET USED TO CARRY OUT THE STUDY WAS DOWNLOADED FROM THE OPEN FOOD FACTS WEBSITE "THE FREE FOOD PRODUCTS DATABASE" (HTTPS://WORLD.OPENFACTS.ORG)

THE DATASET IS A .CSV FILE WITH A SIZE OF 2.11 GB WHICH CONTAINS 825,285 RECORDS WITH 175 FIELDS EACH.

IT'S A VERY EXTENSIVE DATASET WHERE YOU CAN FIND CODE, CREATOR, PRODUCT NAME, QUANTITY, BRAND, ORIGIN OF THE INGREDIENTS, COUNTRIES WHERE THE PRODUCT IS SOLD, INGREDIENTS OF THE PRODUCT LABEL, PRODUCT IMAGE, NUTRITION GRADE, AMONG MANY OTHERS MORE.

DATA PREPARATION AND CLEANING

IN THE PREPARATION AND CLEANING OF THE DATASET IT WAS OBSERVED THAT THERE WERE MANY FIELDS PER PRODUCT (175 FIELDS) SO THOSE THAT WERE NOT NECESSARY FOR THE STUDY WERE ELIMINATED, LEAVING 3 FIELDS (NAME OF PRODUCT, COUNTRIES AND DEGREE OF NUTRITION).

THE RECORDS THAT CONTAINED SOME "NULL" FIELD WERE ELIMINATED, SO WE WENT FROM 825,285 TO 204,529 RECORDS, ELIMINATING IN THIS WAY 75% OF THE DATA THAT WERE INITIALLY IN THE DATASET.

DATA PREPARATION AND CLEANING
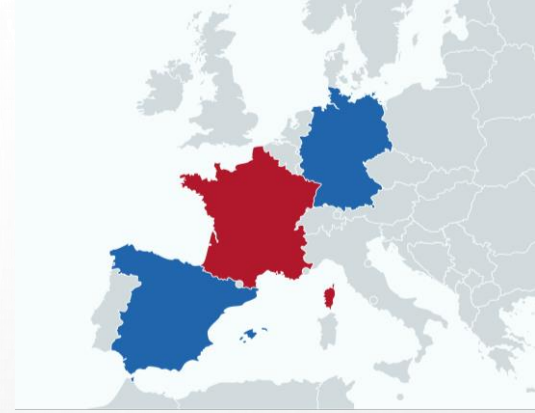
THE MAIN PROBLEM ENCOUNTERED WITH THE DATASET WAS THAT COUNTRIES WERE NOT NAMED IN THE SAME WAY IN ALL THE REGISTERS, SO A MORE PRECISE REVISION HAD TO BE MADE IN ORDER TO FIND ALL THE FORMS AS THE COUNTRIES UNDER STUDY WERE CALLED (FRANCE, SPAIN AND GERMANY).

AFTER THE DATA PREPARATION AND CLEANING, 169,250 FOODS REMAINED FOR FRANCE (90.48%), 7,049 FOODS FOR SPAIN (3.77%) AND 10,745 FOODS FOR GERMANY (5.75%) OF THE TOTAL OF THE 3 COUNTRIES OF 187,044 FOODS.

RESEARCH QUESTION(S)

WHICH COUNTRY BETWEEN FRANCE, SPAIN AND GERMANY SELLS FOODS WITH A HIGHER NUTRITION GRADE (HEALTHY FOODS) ACCORDING TO THE CLASSIFICATION PROPOSED BY PROFESSOR SERGE HERCBERG ?

WHICH COUNTRY BETWEEN FRANCE, SPAIN AND GERMANY SELLS FOODS WITH A LOWER NUTRITION GRADE (UNHEALTHY FOODS) ACCORDING TO THE CLASSIFICATION PROPOSED BY PROFESSOR SERGE HERCBERG?

WHAT IS THE NUTRITIONAL CATEGORY IN WHICH MORE FOOD IS SOLD IN FRANCE, SPAIN AND GERMANY?
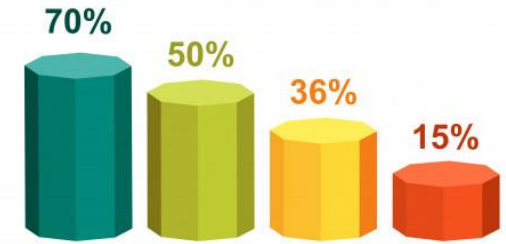
METHODS

THE SCIENTIFIC METHOD WAS USED FOLLOWING THE STAGES OF ACQUISITION, PREPARATION, ANALYSIS, REPORT AND THEN SUGGESTING THE ACTIONS TO BE PERFORMED, SEVERAL ITERATIONS WERE MADE AS THE DATA WERE ANALYZED FOR BETTER UNDERSTANDING.

IN THE ACQUISITION STAGE, SEVERAL DATASET WITH DIFFERENT FORMATS WERE ANALYZED USING DIFFERENT TECHNOLOGIES SUCH AS MONGODB AND READING OF .CSV FILES TO SELECT THE BEST DATASET.

THE DATA WAS PREPARED AND CLEANED USING THE PANDA LIBRARY IN PYTHON.

METHODS

THE DATA WERE ANALYZED WITH THE USE OF DESCRIPTIVE STATISTICS TO COUNT AND CALCULATE THE PERCENTAGES OF FOODS ACCORDING TO THE NUTRITION GRADE SOLD IN FRANCE, SPAIN AND GERMANY.

THE VISUALIZATION METHOD CATEGORICAL BAR GRAPH WAS USED TO REPRESENT THE DATA OBTAINED CLEARLY AND IN THIS WAY TO BE ABLE TO ANSWER THE RESEARCH QUESTIONS.

FINALLY, ACTIONS ARE PROPOSED TO IMPROVE THE QUALITY OF THE PRODUCTS SOLD IN FRANCE, SPAIN AND GERMANY.
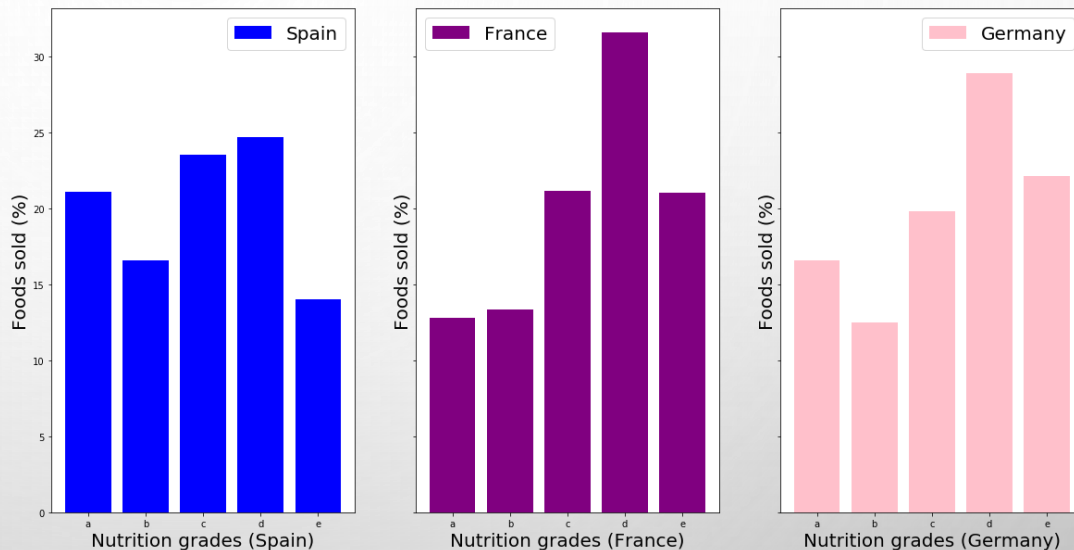
FINDINGS

THE NUTRITIONAL GRADE D IS THE ONE THAT IS MORE PRESENT IN THE FOODS SOLD IN SPAIN, FRANCE AND GERMANY. IT IS OBSERVED WITH GREAT DIFFERENCE THAT IN FRANCE THE NUTRITIONAL GRADE D IS THE MOST OFFERED FOR SALE THAT THE REST OF THE NUTRITIONAL SCALE IN THE SAME COUNTRY.

THE NUTRITIONAL GRADE E IS IN THE LAST PLACE OF THOSE OFFERED FOR SALE IN SPAIN, THIRD PLACE IN FRANCE AND SECOND PLACE IN GERMANY.

THE NUTRITIONAL GRADE A IS IN THIRD PLACE OF THOSE OFFERED FOR SALE IN SPAIN, LAST PLACE IN FRANCE AND FOURTH PLACE IN GERMANY.

Nutrition grades Vs Foods sold by country

FINDINGS

SPAIN IS THE COUNTRY THAT HAS MORE HEALTHY FOODS FOR SALE IN THE NUTRITIONAL GRADE A COMPARED TO FRANCE AND GERMANY, SECONDLY GERMANY HAS MORE HEALTHY FOOD FOR SALE, LEAVING FRANCE IN THE LAST PLACE.

GERMANY IS THE COUNTRY THAT HAS MORE FOOD FOR SALE UNHEALTHY IN THE NUTRITIONAL GRADE E IN RELATION TO FRANCE AND SPAIN, SECOND AND VERY CLOSE IS FRANCE AND A LITTLE FURTHER AWAY SPAIN IN THE LAST PLACE.

Country Vs Foods sold by Nutrition Grade ("A" and "E")
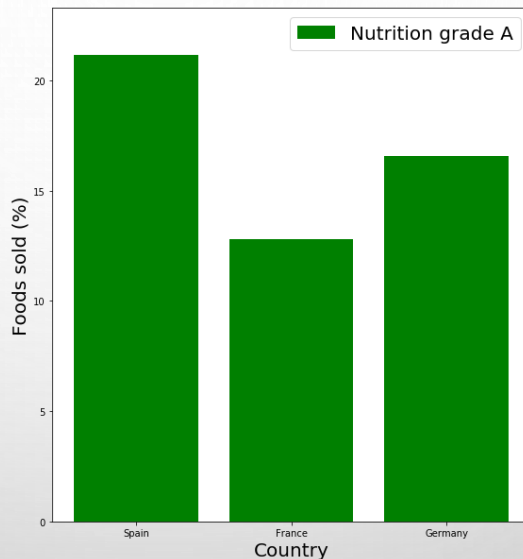
FINDINGS

IF WE RECLASSIFY AND GROUP THE A / B CATEGORIES AS HEALTHY AND THE C / D / E CATEGORIES AS UNHEALTHY, OBSERVING THE DIFFERENT GRAPHS SHOWN BY EACH OF THE COUNTRIES (SPAIN, FRANCE AND GERMANY), IT CAN BE SEEN WITH GREAT DIFFERENCE THAT THE MAJORITY OF THE FOODS SOLD IN EACH OF THESE COUNTRIES ARE UNHEALTHY.

THE COUNTRY WITH THE MOST DIFFERENCE BETWEEN THE SALE OF HEALTHY AND UNHEALTHY FOODS IS FRANCE WITH A 50% DIFFERENCE.

THE COUNTRY WITH THE LEAST DIFFERENCE BETWEEN THE SALE OF HEALTHY AND UNHEALTHY FOODS IS SPAIN WITH A 25% DIFFERENCE.

Food Healthy Vs Food Unhealthy (Spain, France and Germany)
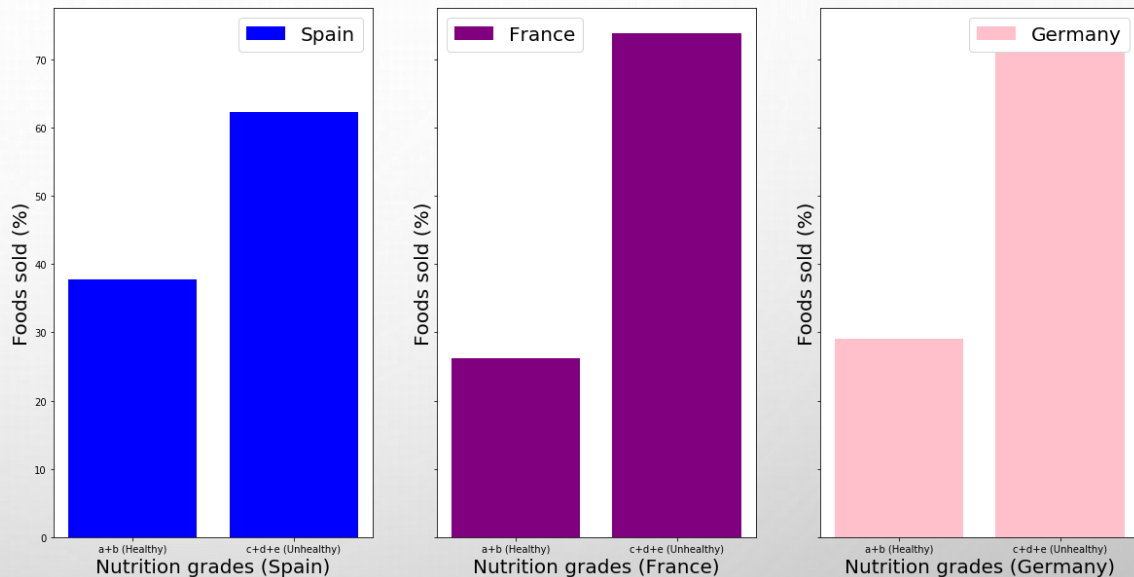
LIMITATIONS

THE RESEARCH HAS BEEN DEVELOPED ON A FREE DATASET THAT STILL DOES NOT CONTAIN ALL THE FOOD THAT IS SOLD IN THE COUNTRIES STUDIED, IT IS CLEAR THAT FRANCE HAS A MUCH LARGER NUMBER OF REGISTERED FOODS COMPARED TO SPAIN AND FRANCE. THIS IS CONSIDERED A LIMITATION BECAUSE IF WE HAD ALL THE FOOD PER COUNTRY, THE STUDY COULD YIELD DIFFERENT RESULTS OR MORE EXACT RESULTS.

AT THE TIME OF PREPARING AND CLEANING THE DATASET THERE WERE MANY NULL VALUES THAT HAD TO BE DISCARDED, THUS AFFECTING THE AMOUNT OF FOOD UNDER STUDY.

CONCLUSIONS

- THE COUNTRY THAT SELLS FOODS WITH A HIGHER NUTRITION GRADE (HEALTHY FOODS) ACCORDING TO THE CLASSIFICATION PROPOSED BY PROFESSOR SERGE HERCBERG IS SPAIN, SECONDLY GERMANY AND LASTLY FRANCE.

- THE COUNTRY THAT SELLS FOODS WITH LESS NUTRITION GRADE (UNHEALTHY FOODS) ACCORDING TO THE CLASSIFICATION PROPOSED BY PROFESSOR SERGE HERCBERG IS GERMANY, SECONDLY FRANCE AND LASTLY SPAIN.

- THE NUTRITIONAL CATEGORY IN WHICH MORE FOOD IS SOLD IN FRANCE, SPAIN AND GERMANY IS THE D THAT IS THE PENULTIMATE CATEGORY OF UNHEALTHY.

- AS A PROPOSED ACTION ACCORDING TO THE STUDY CARRIED OUT, IS RECOMMENDED THAT IN EACH OF THE COUNTRIES STUDIED AN EFFORT BE MADE TO OBLIGE FOOD MANUFACTURERS AND MERCHANTS TO TAKE MEASURES TO SELL FOODS OF BETTER NUTRITIONAL QUALITY. ONE OF THE MEASURES THAT FRANCE HAS CHOSEN AND THAT IS BEING ANALYZED AND WORKING FOR THE REST OF THE COUNTRIES IS MANDATORY LABELING WITH THE NUTRI-SCORE LABEL THAT IS EASY AND QUICK TO UNDERSTAND BY THE GENERAL PUBLIC.

ACKNOWLEDGEMENTS

REFERENCES

- OPEN FOOD FACTS – WORLD (HTTPS://WORLD.OPENFOODFACTS.ORG)

- PROPOSALS FOR A NEW IMPETUS TO THE FRENCH PUBLIC HEALTH NUTRITION POLICY IN THE FRAMEWORK OF THE NATIONAL HEALTH STRATEGY (HTTPS://SOLIDARITES-SANTE.GOUV.FR/IMG/PDF/RAPPORT_HERCBERG_15_11_2013.PDF)

- JUPYTER NOTEBOOK WORKED TO OBTAIN THE RESULTS IN THE NEXT SLIDES (I CAN'T ATTACH THE PDF FILE, IF YOU NEED THE FILE PDF PLEASE TELL ME AND I SEND YOU FOR EMAIL).

JUPYTER NOTEBOOK

Proyecto Final

Importando librerias para el proyecto

In [3]:

```python
import pandas as pd
import matplotlib.pyplot as plt
```

In [4]:

```python
products = pd.read_csv('./csv/en.openfoodfacts.org.products.csv', sep='\t')
```

C:\Users\riche\Anaconda3\lib\site-packages\IPython\core\interactiveshell.py:
2785: DtypeWarning: Columns (0,24,25,26,28,49) have mixed types. Specify dty pe
option on import or set low_memory=False.
  interactivity=interactivity, compiler=compiler, result=result)

In [5]:

```python
products.head()
```

Out[5]:

	code	url	creator	created_t	created_date
0	0000000000010	http://world-en.openfoodfacts.org/product/0000...	openfoodfacts-contributors	1550246813	201 15T16:06
1	000000000000010	http://world-en.openfoodfacts.org/product/0000...	openfoodfacts-contributors	1550246831	201 15T16:07
2	0000000000017	http://world-en.openfoodfacts.org/product/0000...	kiliweb	1529059080	201 15T10:38
3	0000000000031	http://world-en.openfoodfacts.org/product/0000...	isagoofy	1539464774	201 13T21:06
4	0000000000123	http://world-en.openfoodfacts.org/product/0000...	kiliweb	1535737982	201 31T17:53

5 rows × 175 columns

In [6]:

```python
products.shape
```

Out[6]:

(825285, 175)

In [7]:

```
products. index
```

Out[7]:

RangeIndex(start=0, stop=825285, step=1)

In [8]:

```
products. columns
```

Out[8]:

```
Index(['code', 'url', 'creator', 'created_t', 'created_datetime',
       'last_modified_t', 'last_modified_datetime', 'product_name',
       'generic_name', 'quantity',
       ...
       'carbon-footprint-from-meat-or-fish_100g', 'nutrition-score-fr_100g',
       'nutrition-score-uk_100g', 'glycemic-index_100g', 'water-hardness_100
g',
       'choline_100g', 'phylloquinone_100g', 'beta-glucan_100g',
       'inositol_100g', 'carnitine_100g'],
      dtype='object', length=175)
```

In [9]:

```
row_0 = products.iloc[0]
type(row_0)
```

Out[9]:

pandas.core.series.Series

In [10]:

```
print(row_0)
facts-contributors
created_t
1550246813
created_datetime                                      20
19-02-15T16:06:53Z
last_modified_t
1550246813
last_modified_datetime                                20
19-02-15T16:06:53Z
product_name
NaN
generic_name
NaN
quantity
NaN
packaging
NaN
packaging_tags
NaN

brands
```

In [11]:

```
products.isnull().any()
```

Out[11]:

code	False
url	False
creator	True
created_t	False
created_datetime	True
last_modified_t	False
last_modified_datetime	False
product_name	True
generic_name	True
quantity	True
packaging	True
packaging_tags	True
brands	True
brands_tags	True
categories	True
categories_tags	True
categories_en	True
origins	True
origins_tags	True
manufacturing_places	True
manufacturing_places_tags	True
labels	True
labels_tags	True
labels_en	True
emb_codes	True
emb_codes_tags	True
first_packaging_code_geo	True
cities	True
cities_tags	True
purchase_places	True
...	
iron_100g	True
magnesium_100g	True
zinc_100g	True
copper_100g	True
manganese_100g	True
fluoride_100g	True
selenium_100g	True
chromium_100g	True
molybdenum_100g	True
iodine_100g	True
caffeine_100g	True
taurine_100g	True
ph_100g	True
fruits-vegetables-nuts_100g	True
fruits-vegetables-nuts-dried_100g	True
fruits-vegetables-nuts-estimate_100g	True
collagen-meat-protein-ratio_100g	True
cocoa_100g	True
chlorophyl_100g	True
carbon-footprint_100g	True
carbon-footprint-from-meat-or-fish_100g	True
nutrition-score-fr_100g	True
nutrition-score-uk_100g	True
glycemic-index_100g	True

```
water-hardness_100g              True
choline_100g                     True
phylloquinone_100g               True
beta-glucan_100g                 True
inositol_100g                    True
carnitine_100g                   True
Length: 175, dtype: bool
```

In [12]:

```python
products_n1 = products[['product_name','countries','nutrition_grade_fr']]
```

In [13]:

```
products_n1. head( 50)
```

Out[13]:

	product_name	countries	nutrition_grade_fr
0	NaN	en:FR	NaN
1	NaN	en:FR	NaN
2	Vitória crackers	France	NaN
3	Cacao	France	NaN
4	Sauce Sweety chili 0%	France	NaN
5	Mini coco	France	NaN
6	Pistou d'ail de sours	France	NaN
7	Pain maïs	en:france	NaN
8	Mendiants	France	NaN
9	Salade de carottes râpées	France	b
10	Fromage blanc aux myrtilles	France	NaN
11	NaN	France	NaN
12	Vainilla	France	NaN
13	Baguette parisien	France	NaN
14	"Baguette Lyonnais"	France	NaN
15	Solène céréales poulet	France	NaN
16	Tarte noix de coco	France	d
17	Salade de fruits exotiques	France	NaN
18	Chouquettes x30	France	NaN
19	Pain de maïs bio	en:france	NaN
20	Tisane Cassis	en:france	NaN
21	Fromage blanc pêche	France	NaN
22	Crème dessert chocolat	France	NaN
23	Bouillie de sarrasin	France	NaN
24	Compote de poire	France	a
25	Paëlla de poulet	France	NaN
26	NaN	en:France	NaN
27	NaN	en:France	NaN
28	Aiguillettes de poulet	France	NaN
29	Salade shaker chef	France	NaN
30	Salade de macedoine de légumes	France	b
31	Baguette Poitevin	France	NaN
32	Suedois thon	France	NaN
33	Ciabatta Bombay	France	NaN

	product_name	countries	nutrition_grade_fr
34	Ciabatta Roma	France	NaN
35	Salade tomate	France	NaN
36	Farine de blé noir	France	NaN
37	Mousse chocolat douceur	France	NaN
38	Coca des flandres	France	NaN
39	Brochettes dinde	France	NaN
40	Suedois saumon	France	NaN
41	Saucisse au chou fumé BBC SV (Morteau)	en:france	NaN
42	Crêpes au Kamok	France	NaN
43	Salade shaker taboulé	France	NaN
44	Banana Chips Sweetened (Whole)	United States	NaN
45	Peanuts	United States	NaN
46	Sandwich classique fromage	France	NaN
47	Pain epeautre	France	NaN
48	Sandiwch Tradition Complet Jambon	France	NaN
49	Fromage blanc à la creme de marron	France	NaN

In [14]:

```
products_n1.isnull().any()
```

Out[14]:

```
product_name          True
countries             True
nutrition_grade_fr    True
dtype: bool
```

In [15]:

```
products_n1.shape
```

Out[15]:

```
(825285, 3)
```

In [16]:

```
products_n1_before=products_n1.shape
```

In [17]:

```
print(products_n1_before)
```

```
(825285, 3)
```

In [18]:

```
products_n1=products_n1.dropna()
```

In [19]:

```
products_n1. shape
```

Out[19]:

(204529, 3)

In [20]:

```
products_n1.head(100)
```

Out[20]:

	product_name	countries	nutrition_grade_fr
9	Salade de carottes râpées	France	b
16	Tarte noix de coco	France	d
24	Compote de poire	France	a
30	Salade de macedoine de légumes	France	b
50	Abondance	France	d
52	cuisse de poulet direct au four curry	France	c
53	Bagel	France	b
56	BAguette bressan	France	a
58	Pavé de saumon fumé à la ficelle	France	d
60	CORNEDBEEF	France	d
70	Salade Grecque	France	b
239	Cranberries	United States	c
275	Stylo glaçage gris	France	e
283	Blanquette de Volaille et son Riz	France	b
284	Raviolini au Fromage de chèvre et Pesto	France	b
286	Salade Cesar	Canada	c
290	Broyé de la grande Aquitaine aux noix du sud-o...	France	e
300	Entremets Crème Brulée	France	b
317	Chaussons tressés aux pommes	Canada	c
333	Pain Burger Artisan	Canada	b
334	Pain de mie sans gluten	France	c
337	Root Beer	France, États-Unis	e
343	A&w - Root Beer -355ml	France	e
345	Quiche Lorraine	Canada	b
347	Compote de Pomme	France	b
348	Bonbons acidulés Raisin Fraise	France	d
355	Thé noir aromatisé violette et fleurs	France	c
369	Pate d'amandes	France	d
371	Pâte d'Amandes	France	d
378	Colorant alimentaire	France	c
...	...	...	...
597	Persil	France	b
599	Nacho nuss-nougat	France	e
605	Big Choco Framboise	France	e

	product_name	countries	nutrition_grade_fr
615	Coquilles Saint-Jacques Nantaises	France	c
622	Cannellonis a labolognaise	France	c
623	Quenelles de brochet sauce Nantua	France	d
626	Cuisses de poulet	France	c
628	Tarte aux abricots	France	d
629	Pasteis denata	France	d
631	Chicken Nachos	France	c
640	Nutella	en:DE	e
642	Huile d'olive vierge extra	France	d
650	Marmite Original Pate A Tartiner 125G	France	c
651	Tomato Ketchup Heinz Ouverture En Bas	France	d
652	Tomato Ketchup	France	d
653	7Up	France	e
657	Bûche la forêt noire	en:france	d
660	Madeleines nature	France	d
662	Véritable pâte à tartiner noisettes chocolat noir	France	e
692	Pruneau d'agen	France	c
711	The simpsons donuts	France	e
715	Croissants pur beurre	France	e
723	Confit d'Oignons ou de figues	France	c
728	Cakes Raisins	France	d
732	Cakes aux Fruits	France	d
735	Tarte normande	France	d
743	Pure Whey Protein Berries & Cream	France	d
744	Pure Whey Protein™ Chocolate Peanut	France	d
764	Financiers aux Amandes	France	e
772	Fondants Citron	France	e

100 rows × 3 columns

In [21]:

```
number_of_countries = products_n1.countries.value_counts()
```

In [22]:

```
number_of_countries.head(10
0)
```

Out[22]:

France	149610
Deutschland	6398
United States	3964
España	3399
México	3227
en:france	2325
Suisse	1911
France, Suisse	1770
Belgique, France	1644
Belgique	1548
United Kingdom	1442
Frankreich, Deutschland	1142
Italia	927
France, en:belgium	836
Sverige	764
France, Switzerland	761
Francia,España	705
Francia, Spain	673
Francia, España	597
Australia	593
France, Royaume-Uni	588
Suisse, en:france	583
France,Belgium	493
Deutschland, Switzerland	466
France,Portugal	434
France,Royaume-Uni	420
Belgium, France	420
France, Luxembourg	404
Polynésie française	371
Francia,Italia	371
France, United States, Schweiz	326
France, Ireland	318
Belgique, France, Suisse	318
Polska,Polska	81
France, Rhône	81
Canada	81
en:CH	79
France, UK	78
France	77
Romania	75
Spain	74
Belgium	74
France, Allemagne	70
France, Deutschland	67
France, Suisse	67
France, Deutschland, Schweiz	67
Francia	66
France	65
États-Unis	63
France,Germany	61
France,Espagne	61
België	60
Italy	59
Hong Kong	59
France, en:en	59
en:ES	59

```
NewZealand                              58
en:Switzerland                          58
France, Guyane                          58
en:IT                                   57
Россия                                  56
France,Switzerland                      56
Name: countries, Length: 100, dtype: int64
```

Cantidad de alimentos según el grado de nutrición vendidos en Francia, Estados Unidos, Inglaterra y Suiza

In [23]:

```python
number_of_nut_grade = products_n1.nutrition_grade_fr.value_counts()
```

In [24]:

```python
number_of_nut_grade.head()
```

Out[24]:

```
d    63733
c    43000
e    42054
Name: nutrition_grade_fr, dtype: int64
b    27911
a    27801
```

Cantidad de alimentos según el grado de nutrición vendidos en Francia

In [25]:

```python
is_France = (products_n1['countries'].str.contains('France')) | (products_n1['countries'].s
products_n1[is_France][5:15]
products_n1[is_France].count()
```

Out[25]:

```
product_name            169250
countries               169250
nutrition_grade         169250
_fr
dtype: int64
```

In [26]:

```
products_n1[ is_France]
```

Out[26]:

	product_name	countries	nutrition_grade_fr
9	Salade de carottes râpées	France	b
16	Tarte noix de coco	France	d
24	Compote depoire	France	a
30	Salade de macedoine delégumes	France	b
50	Abondance	France	d
52	cuisse de poulet direct au fourcurry	France	c
53	Bagel	France	b
56	BAguette bressan	France	a
58	Pavé de saumon fumé à laficelle	France	d
60	CORNEDBEEF	France	d
70	Salade Grecque	France	b
275	Stylo glaçage gris	France	e
283	Blanquette de Volaille et son Riz	France	b
284	Raviolini au Fromage de chèvre etPesto	France	b
290	Broyé de la grande Aquitaine aux noix dusud-o...	France	e
300	Entremets Crème Brulée	France	b
334	Pain de mie sansgluten	France	c
337	Root Beer	France, États-Unis	e
343	A&w - Root Beer -355ml	France	e
347	Compote dePomme	France	b
348	Bonbons acidulés RaisinFraise	France	d
355	Thé noir aromatisé violette etfleurs	France	c
369	Pate d'amandes	France	d
371	Pâte d'Amandes	France	d
378	Colorant alimentaire	France	c
379	Colorant Alimentaire Rouge velours enspray	France	e
381	Colorant alimentaire bleu velours enspray	France	e
382	Pâte àSucre	France	d
396	Pate asucre	France	d
397	Pâte àsucre	France	d
...	...	...	...
825035	Teat	France	d
825037	Deglet Nour D'Algérie	France	a
825047	Tomates farcies	France	b

| | product_name | final | nutrition_grade_fr |
		co un tri es	
825057	Fromage	France	d
825063	Pur jus depomme	France	e
825077	Brioche	France	d
825094	Maxi multifruits	France	e
825103	Beurre de baratte sale	France	e
825110	Noisettes	France	c
825112	Pois chiches noirs	France	b
825117	Huile vierge de noix de France	France	d
825118	Les Estivales Mangue Passion	France	d
825121	Sorbet mangue	France	c
825142	Nectar d'abricot	France	e
825147	Riz basmati	France	a
825173	Beurre de cacahuète	France	d
825196	Jus de fruit Innocent pomme ,peche et poire	en:france	b
825207	Oignons jaunes 40/60	France	a
825209	Chocolat au lait	France	e
825212	Graine de lin brun	France	c
825234	Pate feuilletée sans gluten	France	c
825235	Barquettes Fraise	France	d
825242	Jus multifruits	France	c
825243	Compote à Boire Pomme Poire	France	a
825245	Puree de pomme framboise	France	a
825263	Pizza thon cuite sur pierre	France	d
825267	Chocolat de Couverture Noir	France	e
825278	Mousse au chocolat noir	France	d
825279	Riz parfumé	France	b
825284	Steak haché pur boeuf	France	a

169250 rows × 3 columns

In [27]:

```
number_of_nut_grade_is_france = products_n1[is_France].nutrition_grade_fr.value_counts()
```

In [28]:

```
number_of_nut_grade_is_france.head()
```

Out[28]:

d   53492

c   35808

e   35647

Name: nutrition_grade_fr, dtype: int64

b   21658

a   21645

In [29]:

```
total_france=sum(number_of_nut_grade_is_france)
total_france
```

Out[29]:

169250

In [30]:

```
number_of_nut_grade_is_france_porc = number_of_nut_grade_is_france*100/total_france
number_of_nut_grade_is_france_porc
```

Out[30]:

d   31.605318

c   21.156869

e   21.061743

Name: nutrition_grade_fr, dtype: float64

b   13.387297

a   12.788774

Cantidad de alimentos según el grado de nutrición vendidos en España

In [31]:

```
is_Spain = (products_n1['countries'].str.contains('España')) | (products_n1['countries'].st
products_n1[is_Spain].count()
```

Out[31]:

product_name   7049

countries   7049

nutrition_grade   7049

_fr

dtype: int64

In [32]:

```
number_of_nut_grade_is_spain = products_n1[is_Spain].nutrition_grade_fr.value_counts()
number_of_nut_grade_is_spain.head()
```

Out[32]:

```
d    1743
c    1660
a    1490
Name: nutrition_grade_fr, dtype: int64
e     988
```

In [33]:

```
total_spain=sum(number_of_nut_grade_is_spain)
total_spain
```

Out[33]:

7049

In [34]:

```
number_of_nut_grade_is_spain_porc = number_of_nut_grade_is_spain*100/total_spain
```

In [35]:

```
number_of_nut_grade_is_spain_porc
```

Out[35]:

```
d    24.726912
c    23.549440
a    21.137750
Name: nutrition_grade_fr, dtype: float64
e    14.016173
```

Cantidad de alimentos según el grado de nutrición vendidos en Alemania

In [142]:

```
is_Germany = (products_n1['countries'].str.contains('Alemania')) | (products_n1['countries'
products_n1[is_Germany].count()
```

Out[142]:

```
product_name        10745
countries           10745
nutrition_grade     10745
_fr
dtype: int64
```

In [143]:

```
number_of_nut_grade_is_germany = products_n1[is_Germany].nutrition_grade_fr.value_counts()
number_of_nut_grade_is_germany.head()
```

Out[143]:

d   3105

e   2383

c   2132

Name: nutrition_grade_fr, dtype: int64

b   1345

In [145]:

```
total_germany=sum( number_of_nut_grade_is_germany)
total_germany
```

Out[145]:

10745

In [146]:

```
number_of_nut_grade_is_germany_porc = number_of_nut_grade_is_germany*100/total_germany
```

In [147]:

```
number_of_nut_grade_is_germany_porc
```

Out[147]:

d   28.897161

e   22.177757

c   19.841787

Name: nutrition_grade_fr, dtype: float64

b   12.517450

Histograma sobre el grado de nutrición de los alimentos que se venden en los paises (Spain, Germany and France)

In [72]:

```
number_of_nut_grade_is_spain_porc. d
```

Out[72]:

24.726911618669316

In [280]:

```python
%matplotlib inline
data ={'a': number_of_nut_grade_is_spain_porc.a, 'b': number_of_nut_grade_is_spain_porc.b,
names= list(data.keys())
values = list(data.values())

data_france ={'a': number_of_nut_grade_is_france_porc.a, 'b': number_of_nut_grade_is_franc
names_france =list(data_france.keys())
values_france = list(data_france.values())

data_germany ={'a': number_of_nut_grade_is_germany_porc.a, 'b': number_of_nut_grade_is_ger
names_germany = list(data_germany.keys())
values_germany =list(data_germany.values())

fig, axs = plt.subplots(1, 3, figsize=(20, 10), sharey=True)
axs[0].bar(names, values, color='blue', label='Spain')
axs[0].legend(fontsize=20)
axs[0].set_ylabel('Foods sold (%)', fontsize=20)
axs[0].set_xlabel('Nutrition grades (Spain)', fontsize=20)

axs[1].bar(names_france, values_france, color='purple', label='France')
axs[1].legend(fontsize=20)
axs[1].set_ylabel('Foods sold (%)', fontsize=20)
axs[1].set_xlabel('Nutrition grades (France)', fontsize=20)

axs[2].bar(names_germany, values_germany, color='pink', label='Germany')
axs[2].legend(fontsize=20)
axs[2].set_ylabel('Foods sold (%)', fontsize=20)
axs[2].set_xlabel('Nutrition grades (Germany)',fontsize=20)


fig.suptitle('Nutrition grades Vs Foods sold by country', fontsize=30)
```
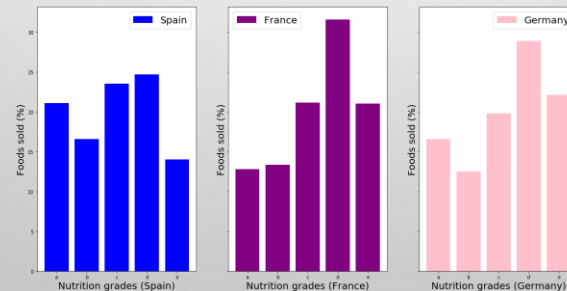
Out[280]:

Text(0.5,0.98,'Nutrition grades Vs Foods sold by country')

Histograma de comparación de grado de almentación (A y E) entre Spain, France and Germany

In [285]:

```
data_A ={'Spain': number_of_nut_grade_is_spain_porc.a, 'France': number_of_nut_grade_is_fr
names_A= list(data_A.keys())
values_A = list(data_A.values())

data_E ={'Spain': number_of_nut_grade_is_spain_porc.e, 'France': number_of_nut_grade_is_fr
names_E= list(data_E.keys())
values_E = list(data_E.values())

fig, axs = plt.subplots(1, 2, figsize=(20, 10), sharey=True)
axs[0].bar(names_A, values_A, color='green', label='Nutrition grade A')
axs[0].legend(fontsize=20)
axs[0].set_ylabel('Foods sold (%)', fontsize=20)
axs[0].set_xlabel('Country', fontsize=20)

axs[1].bar(names_E, values_E, color='red', label='Nutrition grade E')
axs[1].legend(fontsize=20)
axs[1].set_ylabel('Foods sold (%)', fontsize=20)
axs[1].set_xlabel('Country', fontsize=20)

fig.suptitle('Country Vs Foods sold by Nutrition Grade ("A" and "E")', fontsize=20)
```
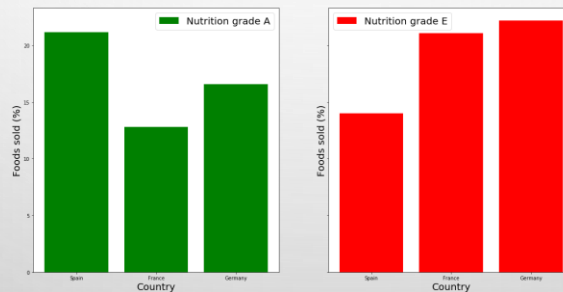
Out[285]:

Text(0.5,0.98,'Country Vs Foods sold by Nutrition Grade ("A" and "E")')

Country Vs Foods sold by Nutrition Grade ("A" and "E")

In [286]:

```python
data ={'a+b (Healthy)': number_of_nut_grade_is_spain_porc.a+number_of_nut_grade_is_spain_p
names= list(data.keys())
values = list(data.values())

data_france ={'a+b (Healthy)': number_of_nut_grade_is_france_porc.a+number_of_nut_grade_is
names_france =list(data_france.keys())
values_france = list(data_france.values())

data_germany ={'a+b (Healthy)': number_of_nut_grade_is_germany_porc.a+number_of_nut_grade_
names_germany =list(data_germany.keys())
values_germany =list(data_germany.values())

fig, axs =plt.subplots(1, 3, figsize=(20, 10), sharey=True)
axs[0].bar(names, values, color='blue', label='Spain')
axs[0].legend(fontsize=20)
axs[0].set_ylabel('Foods sold (%)', fontsize=20)
axs[0].set_xlabel('Nutrition grades (Spain)',fontsize=20)

axs[1].bar(names_france, values_france, color='purple', label='France')
axs[1].legend(fontsize=20)
axs[1].set_xlabel('Nutrition grades (France)', fontsize=20)
axs[1].set_ylabel('Foods sold (%)', fontsize=20)

axs[2].bar(names_germany, values_germany, color='pink', label='Germany')
axs[2].legend(fontsize=20)
axs[2].set_xlabel('Nutrition grades (Germany)', fontsize=20)
axs[2].set_ylabel('Foods sold (%)', fontsize=20)

fig.suptitle('Food Healthy Vs Food Unhealthy (Spain, France and Germany)', fontsize=20)
```
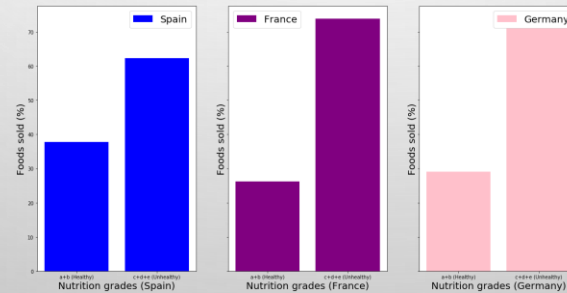
Out[286]:

Text(0.5,0.98,'Food Healthy Vs Food Unhealthy (Spain, France and Germany)')

In [ ]: