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TRANSLATION OF IN, ON, AT AND OVER INTO SPANISH IN A TECHNICAL CONTEXT

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Résumé

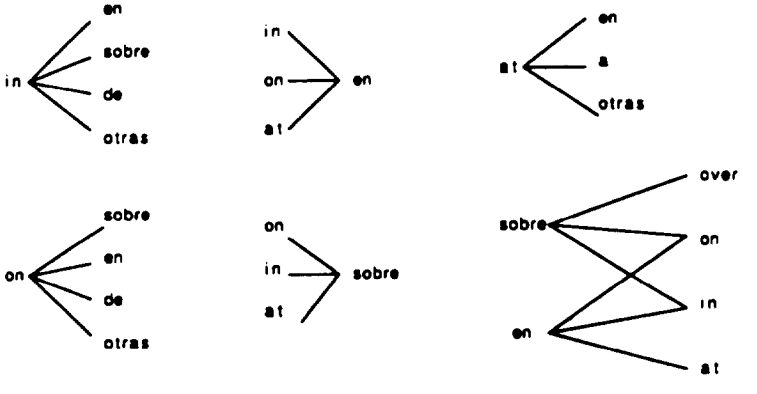
L'auteur étudie quatre prépositions locatives anglaises (in, on, at, over) et leurs traductions espagnoles afin de découvrir lesquelles sont les plus usitées en anglais, dans un contexte technique et scientifique; elle analyse ensuite les traductions espagnoles possibles de ces prépositions au niveau syntaxique et leur utilisation en contexte selon leur prototypicité.

INTRODUCTION

The purpose of this paper is the study of four English locatives within a technical and scientific context and their translation into Spanish.

Peter Newmark (1981: 24) says that the translation of prepositions is one of the major causes of linguistic obscurity as they perform different functions in a variety of languages. But, undoubtely, the basic English locatives *in*, *on*, *at* and *over* are those which present more difficulty to Spanish speakers. The difficulty encountered in translating those prepositions is due to the fact that their semantic meanings are interrelated. The Modern Language Association (1960: 25) pointed out that the Spanish preposition *en* is very often translated as, *in*, *on*, *at*, and relatively infrecuently as *to*, *for* or *of*.

The English preposition *in* is in many contexts equivalent to the Spanish prepositions *en* and *sobre*, but, at the same time, *sobre* is equivalent to the English *on* and *over* and in some contexts can be translated as *above* and *around*. In addition, prepositions *en* and *sobre* are often neutralized by prepositions *de* and *por* when translating *in*, *on* and *over*. These associations can be diagrammed as follows:



On the other hand, Spanish speakers learning English tend to overuse English *in* regardless of whether the context require *in*, *on* or *at*. As Cancino (1980) pointed out this might be due to the following facts:

- there are close phonetic similarities between English *in* and Spanish *en*;
- the syntactic uses of English *in* and Spanish *en* are very similar;
- the semantic ranges of English *in* and Spanish *en* are partly identical.

Similarly, English preposition *at*, in its most common locative use, conveys a sense of vague location which corresponds perfectly to certain uses of the Spanish preposition *en*, as can be seen in the following examples:

- at one end: *en un extremo*;
- at the surface: *en la superficie*;
- at some places: *en algunos lugares*;
- at the source: *en la fuente*.

It is, thus, the purpose of this study to identify the most common English locatives — which are *in*, *on*, *at*, *over*, in a technical context and their translation into Spanish. This was done to fulfill the following purposes:

a) to find out which spatial English prepositions were most frequently used in the different texts;
b) to analyse the different translations into Spanish at the syntactic level and their uses in the context according to their prototypicity.

PROTOTYPICITY

The concept of prototype was established by Rosch (1973) and consists of identifying *the best examples* that illustrate the most basic use of that preposition (Rosch 1973: 112) and analysing the semantic features found in those best examples. The *best* examples are those that come to mind more readily to the native speakers of a language (Rosch *et al.* 1976). Thus, for example the most prototypical use of the preposition *in* would be the one that posseses the largest number of characteristics associated with the category, that is, when the noun governed by the preposition is an example of a container with sharp boundaries (*e.g.*: "There is a pencil in the box"). Rosh also argues for degrees of prototypicality. Examples of the different translations are shown in the appendix.

DATA AND RESULTS

The data for this study consisted of three technical books on the following topics:

- thermodinamics,
- computational mathematics,
- electricity,

and some articles from bilingual semi-technical magazines such as *Scientific American*. The examples from the books were translated from English into Spanish by specialists on the required subject, though not necessarily specialists in the English language.

Initially, the results obtained showed a strong tendency to translate English prepositions *in*, *on* and *at* as *en*. The second important translation was *sobre* for preposition *on* and *de* for prepositions *in* and *on*. Preposition *at* showed more polysemy in its translation into Spanish. In the text of mathematics prepositions *in*, *on* and *at* were often translated as *para*, as in the examples:

- the function is continuous at x = a
  la función es continua para x = a
- that converges on / z-a /
  que converge para los z tales que
- if f and g are polynomials in x-a...
  Si 'f' y 'g' son polinomios para / en x-a

Preposition *over* was always translated as *sobre*, or in its place as the adverbial locution '*encima de*'.

Results of the different texts in percentages are shown in table 1.

The examples from the corpus have been grouped according to their degrees of prototypicity and further they have been compared with their translation into Spanish. The study showed firsly that prepositions in technical texts are closer to their prototypical meaning and, secondly a growing tendency in the Spanish system to translate prepositions *in* and *on*, *as*, *en*.

THE DOMAIN

The semantic domain of spatial English prepositions is more restricted than in the Spanish system and very often the use of a locative will depend on the context, as in the examples:

> "at the corner" (*en la esquina*) versus "on the corner" (*en el rincón*); "at the hospital" (purpose), versus "in the hospital" (3-dimensional space) both translated into Spanish as *en*.

However, the semantic field of Spanish prepositions is not so easily boundered, since their meanings are often interrelated, and they have the ability to commute among them in many contexts

Polysemy — the restricted number of prepositions (20 in the Spanish system, 65 in the English system) could account for their great polysemy. As an example, the Spanish dictionary DRAE registers 18 meanings for preposition *a*, 18 for *de*, 6 for *en*, 5 for *entre*, 14 for *sobre*. Furthermore, the meaning of prepositions often depends on the context. Thus, the meaning of the preposition *de* is different in each of the following contexts: "*la casa de mi padre*" (my father's house), "*vaso de plata*" (a silver glass), "*la calle de la derecha*" (the street on the right) or "*el tren de Londres*" which in its turn has three different possible meanings: "*el tren con destino a Londres*" (the train to London), "*el tren procedente de Londres*" (The train from London) and a third more neutral which explicits the relationship between object and place, *i.e.* "*el tren que es de Londres*" (The London train) or the train which "belongs" to London. Similarly, the English dictionary Longman gathers 18 meanings for preposition *in*, 19 for *on* and 15 for *at*.

Synonimy is more prominent in the Spanish system being a constant cause of translation problems. For example the lexical group "at night" (temporal use of *at*) can by translated as "*de noche*", "*durante la noche*", "*por la noche*". In fact, there exists a great number of examples (see García Yebra 1982: 823).

Semantic polysemy is also considerable as can be seen in any bilingual dictionary. García Yebra (1982: 782-786) gives the following translations for the prepositions studied:

IN: *a, bajo, con, de, en, sobre, dentro de* (extension and modulation techniques).
ON: *a costa de, a orillas de, bajo, contra, de, encima de, mediante, para, por, según, so, sobre, tras.*
AT: *A la orilla de, al borde de, ante, con, de, en, junto a, por.*

Prepositional meaning — prepositions, on the other hand, can modify the meaning of the governing term as occurs in the English system with verbs such as *go in, go out, go up, go away, go on*, etc.

Likewise, in the Spanish system prepositions can modify the term which they govern, as happens with many lexical groups.

This can be seen in some verbs followed by a preposition, such as the verb *tratar* followed by the preposition *de*, the meaning of which depends on the context:

Le trató de señoría	(to give someone a title)
Le trató de loco	(to call someone a fool)
trató de escapar	(he tried to escape)
trata de hacerlo	(try to do it)
trata de medicina	(it is about medicine)

(examples from the DRAE)

TRANSLATION OF PREPOSITIONS

When translating from one language into another there are always some operations which take place at the syntactic level. These operations are obvious taking into account the different syntactic structure of both languages.

However, syntax in technical language is far more simple than everyday language. Syntactic simplicity compensates somehow the density of the information content. This seems logical considering that the first purpose of technical writers is to comunicate their information content as clearly and precisely as possible.

Nevertheless, the syntax in Spanish texts is often more complicated than in English, due to the marked presence of hypotaxis in Spanish language as opposed to the more frequent use of parataxis in English (Vazquez Allora 1977).

Let us first examine the different translation operations that have taken place in our corpus, considering the prepositional syntagm from a formal point of view and following the theories of Newmark (1980), Vazquez y Allora (1977), and Vinay (1976).

■ The first operation observed is the *grammatical transposition* or *transformation*, as in the examples:

To enable electrons in semiconductors to move
que los electrones se movieran en el seno de los semiconductores

In the above sentence the group *in semiconductors to move* has been transformed into a subordinate clause in Spanish. In addition, a new lexical group has appeared: *en el seno de* which conveys the idea of total interiority encountered in the most basic meaning of the preposition *in*. Other translations are not possible since there is syntactic incompatibily, as occurs in the sentence: *letting air rush into the crankcase*: *permitiendo que el aire entre en el cárter*.

Similarly in the sentence :

atoms with nuclei *at their* center
atomos ***con sus nucleos*** *en el centro*

there has been a transposition of the possesive *their* from *center* to *nuclei*.

■ Grammatical transformation also occurs in passive clauses. As the use of passive voice is restricted in the Spanish language, sentences such as:

it is placed; *it is observed*, *it is used for*, etc., so common in technical English are translated as *se coloca*, *se observa*, *se utiliza*, etc. into Spanish with *se* as an indeterminated subject. Example:

In a gasoline engine fuel and air are mixed
En un motor de gasolina se mezclan el combustible y el aceite

■ The *-ing* form is also frequent in technical English, but the use of the gerund form is very restricted in the Spanish language (G.R.A.E.) thus, a kind of transformation is necessary, as in the examples:

When conducting electrons moving in the alumminium: *Cuando los electrones de conducción* ***que se mueven*** *en el interior del aluminio*
the incoming air: *el aire* ***que entra***
passing trough the tips: ***que atraviesa*** *las puntas*

All these lexical groups have been expanded through a relative subordinate clause in Spanish giving origin to a longer sentence.

■ Often what is said in English with a preposition must be translated into Spanish by a complete clause, as otherwise it would not make sense. Thus:

The book on the table: *el libro* ***que está*** *sobre la mesa.*

Sentences such as the one above are frequent in technical English. For example:

a) pumps the coolant through passages in the block and head: *bombea el refrigerante por unos pasos* ***que se encuentran*** *en la culata.*
b) the diagonal through the cube: *la diagonal* ***que atraviesa*** *el cubo.*
c) The flux 0 in the center leg: *el flujo* ***que circula por*** *la columna central.*

■ In these cases and similar the preposition has been expanded through a relative clause.

In addition, the preposition *in* in the example c) has been traslated by the preposition *por*. Actually, Spanish *en* can not be used with verbs of movement whereas English prepositional system admits the use of *in/on* in these kind of instances: *she is in the street (está en la calle)* and *she walks in the street (anda por la calle).* Nevertheless, Spanish *en* contains a range of extension which makes it compatible in certain contexts. For example the sentence:

By the J'R loss of currents that circulate *in* the material

Which translates as:

Por la pérdida de corriente ***que circula en el seno*** *del material.*

It can be observed that the group *in the material* has been modulated and expanded through the lexical group *en el seno de* (or *en el interior de*) not being possible a literal translation *(que circula en el material).* An alternative translation could have been:

...que circula por/a través de el material

■ Similarly, in many occasions the prepositions *in* or *on* instead of being expanded through a clause, are translated as *de*. Let us consider the following examples:

a) a book on the table
b) the book on the table

The appropiate translation for a) is *hay un libro en/sobre la mesa*, and for b) *el libro que está en/sobre la mesa*, but it could also be translated as *el libro de la mesa*. However it can be observed that in example b) the term which governs the English preposition is

preceeded by the determinate article: in contrast to example a) where the indeterminate article is used. Likewise, spanish distinguishes between *ser* and *estar* (both; *to be* in English).

> *the* protein solution in the glass cylinder: *la solución proteínica del cilindro* (*i.e. que hay en*).
> the water in the center of the container: *el agua del centro del contenedor* (*i.e. que está en*).

■ *Dynamic verbs* normally found in process description, are often followed in technical English by a preposition which indicates the modality of the action. These prepositions are not translated into Spanish since their meaning is already implicit in the Spanish verbs. Examples:

> the gases flow out the port: *los gases* ***salen*** *por el orificio*
> the piston moves down: *el pistón* ***desciende***
> compressed air from the crankcase flows into the cylinder: *el aire comprimido* ***entra*** *desde el cárter.*

CONCLUSION

Literal translation of English prepositions *in*, *on*, *at* and *over* into Spanish is not always possible because their semantic meanings frequently overlap, and because there are some syntactic incompatibilities and neutralizations among Spanish prepositions at the sentence level which makes it impossible.

However, in the context of technical and scientific English examined, locatives are closer to their most central or prototypical meaning and a considerable reduction of semantic extension can be observed in the use of prepositions. Polysemy and synonymy, on the other hand, were greater in semi-technical texts, making impossible a classification of the corresponding translations.

Preposition *in* and *on* have been generally translated as *en*. *On* has been generally translated as *sobre* only in those cases where it was necessary to distinguish between the concepts of total interiority (English *in*) and superiority (English *on / over*). Otherwise *en* has been prefered to *sobre*, except in the mathematical context. Preposition *over* has been generally translated as *sobre* or *encima de* (on top of).

Spanish *en* and *sobre* (English *in* and *on*) have been neutralized by prepositions *de* and *por* in some specific contexts. Other translations were negligable.

The preposition *at* has been translated in general as *en* (locative use) or *a* (temporal use); in mathematics these prepositions are frequently translated as *para*.

The cross-linguistic study showed that distinct uses types or sub-categories of prepositions were expressed by the same preposition in both languages, giving evidence that similar mental processes connect the uses (Herskovits 1982).

Pedagogical implications

According to the results obtained a *possitive transfer* between *in* = *en*, *on* = *en / sobre* and *at* = *en / a* can be observed. For this reason Spanish students will not have big difficulties in translating those prepositions from English into Spanish as long as they are aware of the subject matter, but there is a *negative transfers* from Spanish into English, so that Spanish speakers will tend to use *in* in contexts where *on* or *at* should be used, *on* instead of *over* or *in* and *of* instead of *in* or *on*.

TABLE 1
Percentages

a) Thermodinamics		
IN: 200	ON: 116	AT: 98
71% en 1% extensión 41% en 1% a/a través 1,5% para 0,5% sobre/con	63% en 3% a/hacia 19,5% sobre 1% con 7% de 1% ext. 5% para 0,5% por	58% en 2% por 16% con 2% sobre 10% para 21% sobre 6% de 4% resto
b) Mathematics		
IN: 44	ON: 51	AT: 4
75% en 23% de 3% para 1% sobre	71% en 12% para 13% sobre 4% de	64% en 35% para 1% de y sobre
c) Electricity		
IN: 54	ON: 18	AT: 7
89% en 9% de 2% extensión 16% extensión	50% en 22% sobre 6% de 6% a	86% en 14% para

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APPENDIX

IN — EN: ■ *Inclusion in a three-dimensional space*
■ Physical object contained in another

a) Examples of containers:
■ There are very few molecules in the tube
Hay muy pocas moléculas en el tubo
■ ...In the intake manifold
en el colector de entrada

b) 1 or 2-dimensional space:
■ This generates a high voltage in the secondary circuit
lo que genera alta tensión en el secundario
■ For each point 'a' in a connected open set
para cada punto en un conjunto conectado abierto
■ The voltages induced in the windings
las tensiones producidas en los arrollamientos

c) 3-dimensional space with fuzzy boundaries:
■ ...for several fuels burn in air
pues varios combustibles se queman en el aire
■ in a sound wave
en una onda de sonido
■ with cavitations in the oil film
con cavitaciones en la película de aceite
■ sodium chloride in the water
cloruro sódico en el agua

d) The located objects are holes, gapes, etc.
■ varying the number of holes in the fuel injector nozzle
variando el número de agujeros en el inyector

e) Inclusion in an angular object
■ Point A is in angle B
el punto A está en el ángulo B
■ ...to generate small recirculation zones in each corner
para generar pequeñas zonas de circulación en todos los rincones

f) Restricted space or area:
■ in a magnetic fiel
en un campo magnético
Extensional meaning
■ in the field of programming
en el campo de la programación

g) Object occupying part of another:
■ in the middle of...
en mitad de, en el centro de
■ in the neighbourghood
en el entorno de

IN — DE

a) Physical object formming part of another:
■ If A and B are points in I.
si A y B son puntos en ' de I (que hay en, contenidos en)
■ electrons in a television tube
electrones balísticos de un tubo de televisión

b) Object or entity in a highlighted environment:
■ a hole in the wall
hay un agujero en la pared
■ the hole in the wall
el agujero de la pared
■ The protein solution in the glass cylinder
la solución proteínica del cilindro (que hay en)

- the water in the center of the container
  el agua del centro del contenedor (que está en)

IN — POR

Extension:

- The flux O in the center leg
  el flujo O ***que circula por*** *la columna central*
- By the J'R loss of currents that circulate in the material
  Por la pérdida de corriente ***que circula en el seno del*** *material*

ON — SOBRE / EN

Superior position in contact with a horizontal surface

a) Physical object supported by another:
- On the surface of a neutron star
  en la superficie de una estrella de neutrones
- a function is analytic on an open set.
  una función es analítica en / sobre un conjunto abierto
- it creates a torque on each molecule
  crea un momento de giro en cada molécula.

b) Conceptualized as a line:
- The effect on the primary circuit
  el efecto en / sobre el primario
- And recording the images on tape
  registrar las imágenes en cinta

c) Conceptualized as 'sides':
- on opposite legs of the core
  en columnas opuestas al núcleo

d) Conceptualized as 'edges':
- on the edge of the beam
  en / sobre el borde de la viga

ON — SOBRE

a) Grouped by the sema movement:
- Transformers are wound on closed cores
  los transformadores se devanan sobre núcleos cerrados
- Pouring a layer of corn oil on the water
  vertiendo una capa de aceite sobre el agua

b) Contact versus interiority:
- it's a free particle with no force on it
  es una partícula libre sobre la que no actuan fuerzas..
- the deposit on the cathode was grey
  el depósito sobre el cátodo era gris

c) Total covering:
- ...a rational function is analytic on the plane...
  una función racional es analítica sobre todo el plano

AT — A

Coincidence at a point in the time:

a) with magnitudes and values
- at the temperature
  a la temperatura
- at specific frecuency
  a frecuencia específica
- at full voltage
  a tensión máxima

AT — EN

Coincidence at a point in the space: vague location:

- at the spark plug
  en la bujía
- at the cathode
  en el cátodo
- at point 'a'
  en el punto 'a'

AT — PARA

In mathematics:

- the function is continuous at x=a
  la función es continua para x=a