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# PRACTICAL AND LINGUISTIC STRATEGIES FOR POSTEDITING MACHINE TRANSLATION

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Keywords: Machine Translation, Computer-Assisted Translation, Postediting.

Abstract: A set of strategies are presented for use in editing the output of machine translation (MT) systems. They are organized according to the degree of refinement required for the particular application. The first level, aimed at merely reproducing the gist of the original text, focuses on major problems: words not translated by the machine, obvious mistranslations, syntactic scrambling. At the second level the goal is semantic and syntactic correctness, with some devices enlisted to preserve the message structure and enhance cohesion. The resulting translations are adequate for many purposes but they do not capture all the nuances. They can and should be further improved if the text is to be published or closely scrutinized.

The strategies take maximum advantage of word-processing technology and at the same time provide a linguistic framework within which to make quick and effective decisions. Experience with the SPANAM and ENGSPAN systems at the Pan American Health Organization (PAHO) has shown that many of the same principles and considerations apply equally as well to traditional translation and revision.

## 1. INTRODUCTION

Translators have been postediting machine translation (MT) at the Pan American Health Organization (PAHO) for more than a decade. PAHO was the first international organization to offer operational MT. For Spanish to English, the Organization's SPANAM system has been doing business since January 1980; the reverse combination, English-Spanish, has been being handled by ENGSPAN since mid-1984. Both SPANAM and ENGSPAN were developed by PAHO for internal use (Ref. 1). ENGSPAN is now also shared with the U.S. Agency for International Development<sup>1</sup> and two institutions concerned with agricultural research.<sup>2</sup>

At PAHO, MT is the primary mode of translation. As of mid-1990, some 8.7 million words (34,800 pages) had been postedited at the Organization's headquarters in the two language combinations, with a current average of around 1.5 million words (6,000 pages) a year. The subject fields include medicine, public health, sanitary engineering, agriculture, computer science, management, and law, plus many others on an occasional basis. The text types represent a broad range of styles and discourse genres: articles, abstracts, scientific studies, textbooks, health care and computer manuals, grant proposals, minutes of meetings, reports of missions and program activities, product specifications, supply lists, contracts and agreements, business letters, diplomatic exchanges, certificates, promotional materials--even film scripts and captions for displays. Some 30

different translators have served as posteditors at different times in the project's history. This experience has led to a very interesting conclusion:

While not all good translators make good posteditors, the principles that make for good postediting do make for good translation.

The linguistic principles and strategies used for postediting at PAHO have proven so effective that they have been introduced into our traditional translation program as well. Different principles are associated with each of three levels of refinement--partial postediting, rapid postediting, and translation for publication.

## 2. LEVELS OF REFINEMENT

Because it presents the user with a rough draft, machine translation has created new possibilities for the translation industry. We are now able to specify the degree of human effort to be invested in the translation product. "Human" translation, on the other hand, has not traditionally offered such alternatives. Although a quick draft is possible, the intellectual process of generating a translation has always been considered essentially holistic, taking place along a multitude of channels at the same time. It seems silly to think of the subtler aspects being stored separately, waiting to be applied at the end in a final flourish. Certainly there is no easy spigot with which to turn off quality in midstream. The question of whether a semifinished human translation is serviceable does not really come up; no systematic thought has been given to how it might be produced.

With MT, on the other hand, we are confronted for the first time with a text, or quasi-text, that already exists. We must decide what to do with it. The options made available by MT cannot be ignored. We are virtually forced to consider degrees of refinement in the translation product. And we have already learned that in some settings and in some circumstances--for example at the U.S. Air Force's Foreign Technology Division in Dayton, Ohio, and, in some applications, at PAHO--it is indeed possible to trade off refinements for expediency and economy. The key to effective integration of MT into the translation mainstream, and of translator adaptation to MT, lies in recognizing different levels of postediting and in understanding what types of intervention are appropriate at each level.

Level 1. Intervention may be minimized when the translation is for information only. The most venerable and effective application of MT for such purposes, in which a partially edited product provides the gist of the text and is deemed adequate by the end consumers (technical subject experts), is at the Air Force's Foreign Technology Division (FTD) (Ref. 2). Systran has been producing draft translations from Russian into English at the FTD since 1969, and the operation has been expanded to cover German- and French-to-English as well. Bostad (Ref. 3) states that 12 years ago the Russian-to-English output became "mature" enough that it could be delivered to consumers with only partial postediting. The extent of this intervention will be examined later below. It should also be mentioned that in 1987 the three language combinations were made available for 1,700 users to obtain raw translations via desktop PCs--although this application is beyond the scope of the present paper.

Level 2. A distinction has been drawn between translations for assimilation purposes and those for dissemination (Ref. 4). While the application just described is a clear case of the former, and translation for publication is self-defining, at least in terms of its ultimate use, there would appear to be a middle ground that is not quite as easy to pin down.

This is true for both the ultimate use of the translation and the amount of intervention required. Translations that start out for internal use may end up being quoted and widely disseminated. As translators so often point out, once the text is committed to paper, there is no control over its ultimate destination. Still, it does seem possible to identify an intermediate product--either a translation whose use will clearly be limited, or else a text that is to be carefully revised by a technical expert. The viability of such a product was recognized at the European Commission back in 1982, when a mode of rapid postediting was introduced for the revision of French-to-English Systran output (Ref. 5). In the absence of a formal definition of this product, it is safe to say that the MT output is polished to the point that the text is grammatically and propositionally correct, while at the same time staging and the distribution of information are respected--yet it is still short of ideal in terms of idiomatic equivalence, nuances, cohesion, and coherence. This level of intervention also corresponds to specialized, domain-specific applications that are based on a limited vocabulary and are predictable in their structure.

Level 3. Finally, there is the translation for publication. This is the text that does aim for idiomatic equivalence, full capture of nuances, strong use of cohesive devices, and just the right amount of between-the-lines interpretation to provide the necessary coherence. These considerations, together with staging and the distribution of information, which appear already at the level of rapid postediting, call into play the strategies that make for translation of the highest quality, whether it is done by postediting MT output or in the traditional manner.

## 2.1 Level 1: Partial Postediting

An automatic postprocessor (EDITSYS) is used at the U.S. Air Force Foreign Technology Division (Ref. 2) to address the following situations in the MT output: not-found words, acronym expansions, high-risk rearrangement patterns, words frequently miskeyed in the input, source words with more than one meaning that are handled as "slashed entries" or are not yet fully resolved by Systran, and miscellaneous "problem words" (of which there are about 40). When any one of these situations occurs, EDITSYS alerts the human posteditor with a flashing line across the screen. The posteditor responds appropriately at that point but does not usually look at the rest of the text. In fact, only about 20% of the text is affected by EDITSYS-prompted corrections.

This case tells us something about the minimum requirements for MT postediting. As a first priority, foreign words must be replaced. Second, acronyms should be checked. Third, some types of syntactic rearrangement need to be looked at because they are vulnerable to scrambling. Fourth, words with more than one meaning can lead to serious mistranslations, and with experience the most pesky ones, as well as other trouble-makers, can be identified beforehand.

Figure 1 shows the major errors highlighted on a page of SPANAM output from a set of scientific abstracts being translated from Spanish to English for information-only purposes. The total passage, 1,688 words long, averaged less than one major error per 1,000 words. On this particular page there happened to be a cluster of examples. First, there is a translation of reactivos which is ridiculous in the context. Second, the verb phrase se les preguntaba was rendered so poorly that the translation is scrambled and incomprehensible. Third, experimentar was incorrectly translated for the context. And finally, the phrase dolor referido yielded the technical expression 'referred pain', which is again incorrect for the context.

Figure 2 presents the reverse situation, i.e. abstracts being trans-

lated from English into Spanish by ENGSPAN, also for information only. The insertion of 'de' to translate the noun phrase tobacco exposure, with the result 'exposición de tabaco', turns the situation around: the tobacco becomes exposed instead of the person. The second error, because it is funny, is easy to spot in the course of postediting. The third one, also entertaining, illustrates why it is important to check all acronyms. Like the SPANAM job in Figure 1, this text averaged about one major error per 1,000 words.

Figure 3 shows the corrections for SPANAM, and Figure 4, for ENGSPAN.

It is interesting to note the quality of the two MT outputs apart from the problem areas in question. They can be read and adequately understood by a monolingual person who is familiar with the subject matter, especially after some experience with MT output. Although the errors were not frequent, the importance of finding them is clear. They are so few that, in the absence of an aid like EDITSYS, they could even be introduced by hand instead of on-screen. Posteditors who can learn to quickly scan output for information purposes and pick up the major problems will be helping to open up new frontiers in the translation profession. There will be increasing need for such individuals as we face the challenge of more and more information to retrieve from data bases--information that has not been being translated before and which represents a daunting, probably insurmountable, task for traditional human translation.

## 2.2 Level 2: Rapid Postediting

The intermediate level of intervention presumes, of course, all the criteria at the previous level. But here we are also looking at full grammaticality and semantic precision. The propositional content of the original text is rendered clearly and accurately, although time is not necessarily spent on technical terminological research. In addition, attention is given to of discourse organization, i.e. faithful staging and delivery of new information, coupled with the use of cohesive devices (Ref. 6).

At PAHO, posteditors are encouraged to take discourse considerations into account. Since discourse organization is universal and syntax is language-specific, it stands to reason that the original text is best served when priority is given to the former. The approach calls for conscious and systematic application of the principles contained in Halliday's "grammar of messages" (Ref. 7). This is the grammar that is concerned with "staging" the message unit<sup>3</sup> and regulating the delivery of "new information."

Staging (Ref. 8) is the process whereby the element is chosen with which to begin the unit--i.e. the theme. This element expresses the link with the object of thought in the writer's mind (Ref. 9). The information system, in turn, regulates the delivery of given and new information. New information must always be presented in a context of givens, since what is given, either in the previous text or in the reader's knowledge base, serves as a point of reference for judging newness. To put it another way, in order for a message to be meaningful, the information it conveys must be attached to an existing node. Within each message unit there is a buildup to the presentation of focus of newest information (Ref. 10). This focus is usually the culmination of the unit and the point at which it comes to a close. The two processes of staging and information, working in tandem, create the boundaries of the unit, and ultimately they account for the organization of pieces of language into text.

Given the positional importance of theme and focus--the one at the beginning and the other at the end, with increasingly newer information building up over the course of the unit--it is incumbent on the translator to preserve the same order of elements whenever possible (Ref. 11). Often,

however, there are constraints that make this difficult. The source and target syntax may not match up, or there may be no one-to-one equivalents for certain words or expressions; the translator is forced to shuffle things around. In our work at PAHO, in both MT postediting and traditional translation, we discourage rearrangement. We would prefer that the translators change the syntax whenever by doing so they can preserve the original order of thoughts in the message and basically retain from left-to-right progression of the text (Ref. 12). This approach has been shown to produce translations that are more cohesive and easier to grasp. It is also more consonant with the characteristics of word processing--and hence much faster!

Figure 5 shows another page from the same job we saw in in Figure 1. It has been subjected to rapid postediting. Typical of technical abstracts in Spanish, a number of the sentences are "subjectless"--in other words, they begin with impersonalized verbs. The first sentence is an example of how the syntax can be altered to keep the theme and focus in the same position: the head noun in the prepositional phrase is made to do duty as the subject. As a result, the newest information is able to remain in focus position. Throughout the page the corrections avoid putting the passive verb at the end. When an inversion is necessary, it is done as locally as possible, leaving the rest of the unit intact.

The final clause gives another example of syntactic adjustments to preserve the order of information: the MT output 'is expressed the desire that intensifies the collaboration...' is changed, with a minimum of keystrokes (a macro does the local rearranging), to read: 'the desire is expressed for more intensified collaboration'.

The change of 'both' to 'the two' is an example of enhanced cohesion. The latter expression helps to pinpoint the antecedents in English and at the same time sets up a dichotomy that lays the groundwork for the notion of 'separately'. The change of 'of' to a more specific preposition also helped to heighten cohesion.

Another type of change, one of the commonest in postediting, was deletion of the definite article. This is done on the word processor with a single "macro" keystroke that "seeks and destroys" the next occurrence. Translators at PAHO are provided with guidelines for dealing with the definite article (Ref. 13). For example, they are told that the following rule is quite reliable:

'the N of the N' ==> 'the N of N' or 'N of the N'

Of course, there are many rules that affect the definite article in English (Ref. 14), and much depends on the posteditor having the judgment to decide the order in which they apply.

Thus it can be seen that with a few strategic repairs the text shapes up quite effectively. The rapidly postedited version is a vast improvement over the original output.

### 2.3 Level 3: Translation for Publication

It is at the third level that the posteditor sharpens up word choices and ventures into the realm of interpreting between the lines. What is at stake here is coherence. The surface pieces of the discourse are made to connect in ways that are more meaningful based on unexpressed underlying readings. (Cohesion, which we saw at the previous level, has to do with devices that can be specified; a given element in discourse is made clearer through its ties with another--Ref. 6). In an earlier study (Ref. 15), I calculated that at the level of rapid postediting most of the

changes had to do with syntactic corrections and cohesive devices, while at the level of translation for publication, 79% of the changes were interpretations for coherence. The proportion is somewhat lower in the present case.

Figure 6 shows further improvements on the rapid postediting done in Figure 5. A number of them are cohesive--for example, the introduction of a "shop talk" style, with 'work' becoming 'study' and 'the use of drugs' becoming 'drug use'. The introduction of 'also' in the last sentence of the second paragraph is cohesive in that it helps to point up the logical development of the discourse. It also brings the theme closer to its original position. In the last paragraph a relative clause is reduced in order to de-emphasize a part of the sentence that belongs in background. The shift of 'treatment' to a later position borders on the interpretive, but the purpose was cohesive; previously it had been too far away from what was being treated, slowing down the reader's comprehension.

The most interesting change is the one in the second paragraph in which 'hampered' is introduced. The motivation is clearly for better coherence. The posteditor has assumed the role of interpreter. The new logic is more direct and therefore works better in carrying the idea forward.

The changes at this level are more creative and less predictable. They are aimed at achieving maximum effectiveness and nuancing: precise use of words in terms of semantic content, register, and idiomaticity; preservation of theme and focus; strong cohesion aimed at facilitating the reader's progress through the text; and judicious interpretation of the underlying discourse in order to make it cohere.

Despite the array of possibilities and the variety of criteria to be considered, it can be seen that the process did not involve major revamping of the text.

### 3. CONCLUSION

Machine translation has opened up new vistas in our understanding of translation quality and serviceability. In getting to this point we have discovered linguistically different strategies that correspond to levels of refinement in the product delivered to the consumer.

Application of these principles involves judgment at every step along the way--judgment in knowing what level of intervention will be adequate for the use envisaged, judgment in knowing what types of changes are effective, and judgment in knowing when to leave the text alone. One of the most disappointing experiences in working with MT is to see valid output changed. Unfortunately this happens quite often; the changes may be gratuitous, or they may actually be wrong. We must avoid wild flights of fancy and elaborate recastings. Newmark (Ref. 16), in speaking of human translation, has already said:

A good translator abandons a literal version only when it is plainly inexact... A bad translator will always do his best to avoid translating word for word.

Changes should always be justifiable on linguistic grounds. A clear hierarchy has been identified: at the first level, only major misconstructions are dealt with; at the second level, syntactic and semantic problems are addressed, always with discourse organization in mind, and attention is paid to cohesion; and at the highest level, cohesion is further strengthened and interpretations are made to improve coherence. The strategies at this level are equally applicable to human translation.

## NOTES

1. The development of ENGSPAN was partially supported by the U.S. Agency for International Development under Grant DPE-5543-G-SS-3048-00, awarded to the Pan American Health Organization in August 1983.
2. The International Center for Tropical Agriculture in Cali, Colombia, and the International Rice Research Institute in the Philippines.
3. In normal circumstances, the message unit corresponds to the complete sentence, including all its embedded clauses; when the sentence is incomplete, the message unit corresponds to the presenting fragment.

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Las puntuaciones obtenidas en el cuestionario se OK  
diferenciaron significativamente. En todos los reactivos, PP 09  
los casos puntuaron más alto que los no casos. Sin PP 13  
embargo, sólo se observó discriminación significativa en el  
60% de ellos, lo cual sugiere que el instrumento es útil  
para esta población pero que es necesario revisar la  
formulación de las preguntas con el objeto de obtener un  
instrumento más eficaz.

The scorings obtained in the questionnaire were  
differentiated significantly. In all the reagents the  
cases scored higher than the non cases. However, there  
was only observed significant discrimination in 60% of  
them, which suggests that the instrument is useful for this  
population but that it is necessary to review the  
formulation of the questions for the purpose of obtaining  
a more effective instrument.

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31. CONDES LARA M, CALVO JM, FERNANDEZ-GUARDIOLA A.  
Pain, 11:185-200, 1981.

31. CONDES LARA M, CALVO JM, FERNANDEZ-GUARDIOLA A.  
Pain, 11:185-200, 1981.

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Se estimuló la pulpa dentaria de sujetos voluntarios OK GT  
durante 120 min a intensidades que producían dolor  
soportable. Se registraron potenciales evocados PP 14  
corticales, la actividad electroencefalográfica, los  
electromiogramas de los músculos superciliar y masetero y  
la respuesta galvánica de la piel. Cada 30 min, sin NO 11 GT  
suspender la estimulación, se les preguntaba a los sujetos  
sobre las sensaciones que experimentaban con sus estímulos.

There was stimulated the dental pulp of voluntary  
subjects during 120 min to intensities that produced  
bearable pain. There were registered cortical evoked  
potentials, electroencephalographic activity,  
electromyograms of the superciliary and masseter muscles  
and the galvanic skin response. Each 30 min, without  
suspending the stimulation, was asked them to the subject  
on the sensations that experimented with their stimuli.

Se observó una disminución progresiva en todas las OK  
respuestas poligráficas junto con una disminución en la  
sensación de dolor referido por los sujetos.

There was observed a progressive reduction in all the  
polygraphic responses together with a reduction in the  
sensation of referred pain by the subjects.

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Figure 1. Major errors highlighted in translation for information-only purposes  
(Spanish-English, SPANAM<sup>tm</sup>; total text had 13 such errors in 1,688 words).

305429	NT	305429
The epidemiology of tumors of the upper respiratory and digestive tracts (*URDT) is discussed.	SD OK	Se trata la epidemiología de los tumores de los tractos superiores respiratorios y +digestivos+ (URDT).
*URDT cancer accounts for 8.2% of cancer mortality, 13% in men and 1.5% in women. On the av, *URDT cancer occurs between 55 and 60 yr of age. Variations in the incidence of *URDT cancer with time and geographic location are considered. *URDT cancers can be divided into three main subsets according to site: mouth, oropharynx, and larynx; nasal fossa and bony massive of the facial nerve; and cavum. Tobacco and alcohol ingestion seem to be related to cancers of the first subset. The risk of tumors in these areas due to tobacco exposure is related to the quantity smoked and the age at which smoking was begun. Pipe and cigar smoking are less toxic than is cigarette smoking. A synergistic relationship between alcohol and tobacco intake is evident. Signs of cancers of the cavum include the detection of SIN 2 antigen and *Epstein Barr virus genome. (8 references).	SD OK SD OK SD OK SD OK NO 06 NO 05 NO 02 PP 22 NO 08 TU SD PP 15 NO 03	El cáncer de URDT representa un 8,2% de mortalidad de cáncer, 13% en los hombres y un 1,5% en las mujeres. En el promedio, cáncer de URDT ocurre entre 55 y 60 años de edad. Se consideran las variaciones en la incidencia del cáncer de URDT con tiempo y localidad geográfica. Los cánceres de URDT pueden estar divididos en tres subconjuntos principales según el sitio: la boca, la orofaringe y la laringe; la fosa nasal y huesudo masivo del nervio facial; y la cavidad. El tabaco y la ingestión de alcohol parecen estar relacionados a los cánceres del primer subconjunto. El riesgo de los tumores en estas áreas debidas a la exposición <u>de</u> tabaco está relacionado a la cantidad fumada y la edad al cual el tabaquismo se empezó. <u>El tabaquismo de tuberías</u> y puros son menos tóxicos que es el fumar cigarrillos. Una relación sinérgica entre el alcohol y #la ingesta# de tabaco es evidente. Los signos de los cánceres de la cavidad incluyen la detección del <u>PECADO</u> 2 antigeno y el genoma viral de Epstein Barr. (8 referencias).

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Figure 2. Major errors highlighted in translation for information-only purposes (English-Spanish, ENGSPAN™; total text had 15 such errors in 1,574 words).

The scorings obtained in the questionnaire were differentiated significantly. In all the reagents <sup>reactors</sup> the cases scored higher than the non cases. However, there was only observed significant discrimination in 60% of them, which suggests that the instrument is useful for this population but that it is necessary to review the formulation of the questions for the purpose of obtaining a more effective instrument.

31. CONDES LARA M, CALVO JM, FERNANDEZ-GUARDIOLA A. Pain, 11:185-200, 1981.

There was stimulated the dental pulp of voluntary subjects during 120 min to intensities that produced bearable pain. There were registered cortical evoked potentials, electroencephalographic activity, electromyograms of the superciliary and masseter muscles and the galvanic skin response. Each 30 min, without suspending the stimulation <sup>was</sup> was asked them to the subjects <sup>they</sup> experimented <sup>about</sup> on the sensations that experimented with their stimuli.

There was observed a progressive reduction in all the polygraphic responses together with a reduction in the sensation of preferred pain <sup>indicated</sup> by the subjects.

Figure 3. Corrections to errors in Figure 1.

305429

Se trata la epidemiología de los tumores de los tractos superiores respiratorios y +digestivos+ (URDT).

El cáncer de URDT representa un 8,2% de mortalidad de cáncer, 13% en los hombres y un 1,5% en las mujeres. En el promedio, cáncer de URDT ocurre entre 55 y 60 años de edad.

Se consideran las variaciones en la incidencia del cáncer de URDT con tiempo y localidad geográfica. Los cánceres de URDT pueden estar divididos en tres subconjuntos principales según el sitio: la boca, la orofaringe y la laringe; la fosa nasal y huesudo masivo del nervio facial; y la cavidad. El tabaco y la ingestión de alcohol parecen estar relacionados a los cánceres del primer subconjunto.

El riesgo de los tumores en estas áreas debidas a la exposición <sup>al</sup> de tabaco está relacionado a la cantidad fumada y la edad a la cual el tabaquismo se empezó. <sup>fumar</sup> El tabaquismo <sup>en pipas</sup> de tubos y puros son menos tóxicos que es el fumar cigarrillos. Una relación sinérgica entre el alcohol y #la ingesta# de tabaco es evidente. Los signos de los cánceres de la cavidad incluyen la detección del <sup>SIN</sup> PECADO 2 antígeno y el genoma viral de Epstein Barr. (8 referencias).

Figure 4. Corrections to errors in Figure 2.

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En este trabajo se presenta un panorama global acerca del alcoholismo y el uso de drogas en México. Ambos temas se presentan por separado, debido a que en México el alcoholismo y el uso de drogas difieren en su magnitud, en su patrón de presentación y en sus consecuencias sociales.

Se dan datos sobre indicadores indirectos, recurriendo a las tasas de cirrosis hepática, y se señala la dificultad para la interpretación de este dato debido a las condiciones de desnutrición que imperan en América Latina. Asimismo, se dan los resultados de algunas encuestas, ponderando la clasificación de \*Marconi. Se señala que estas encuestas indican que los hombres consumen más alcohol que las mujeres. Se dan cifras de otros indicadores indirectos en los que el uso de alcohol está involucrado con el suicidio, los homicidios, los delitos y los accidentes.

Para finalizar, se mencionan algunos programas de tratamiento que el Instituto Mexicano de Psiquiatría está llevando a cabo en lo que respecta al alcoholismo y a la inhalación deliberada en grupos de menores, y se expresa el deseo de que se intensifique la colaboración con organismos internacionales.

In this work ~~there is~~ presented an overall panorama concerning alcoholism and the use of drugs in Mexico. Both topics are presented separately, since in Mexico alcoholism and the use of drugs differ in their magnitude, in their pattern of presentation and in their social consequences.

There are given Data on indirect indicators, <sup>with</sup> resorting to the rates of cirrhosis of the liver, and <sup>it</sup> is pointed out that the difficulty for the interpretation of this ~~item of~~ data is due to the conditions of +undernutrition+ that prevail in Latin America. In addition, ~~there are given~~ the results of some surveys, <sup>ed according to</sup> weighing the classification of Marconi. It is pointed out that these surveys indicate that men consume more alcohol than women. There are given Figures of other indirect indicators in which the use of alcohol is involved with suicide, homicides, crimes and accidents.

In conclusion, there are mentioned some programs for treatment that the Mexican Institute of Psychiatry is carrying out in regard to alcoholism and to deliberate inhalation in groups of minors, and is expressed the desire that intensifies the collaboration with international agencies.

Figure 5. Rapid postediting of SPANAM output.

<sup>study</sup>  
 This work presents an overall panorama of alcoholism and ~~the~~ use of drugs in Mexico. The two topics are presented separately, since in Mexico alcoholism and ~~the~~ use of drugs differ in <sup>terms</sup> their magnitude, ~~in their~~ pattern of presentation, and ~~in their~~ social consequences.

<sup>Figures</sup> Data are given <sup>based</sup> on indirect indicators, <sup>including</sup> with resort to rates for cirrhosis of the liver, and it is pointed out that the difficulty in interpretation of ~~this item of~~ <sup>such</sup> data is <sup>hampere</sup> due to the ~~prevalence of~~ <sup>prevalence of</sup> undernutrition ~~that prevail~~ in Latin America. In addition, the results <sup>from</sup> of some surveys are given, weighed according to the ~~classification of Marconi's~~ <sup>classification of Marconi's</sup>. ~~It is pointed out that these surveys~~ <sup>which</sup> indicate that men consume more alcohol than women. ~~Figures for other indirect indicators~~ <sup>also</sup> are given in which the use of alcohol is involved with suicide, homicides, crimes and accidents.

In conclusion, mention is made of some programs <sup>being</sup> ~~conducted by~~ <sup>conducted by</sup> the Mexican Institute of Psychiatry ~~is carrying~~ <sup>is carrying</sup> out ~~for alcoholism and deliberate inhalation~~ <sup>the treatment of</sup> in groups of minors, and the desire is expressed for more intensified collaboration with international agencies.

This study presents an overall panorama of alcoholism and drug use in Mexico. The two topics are presented separately, since in Mexico alcoholism and drug use differ in terms of magnitude, pattern of presentation, and social consequences.

Figures are given based on indirect indicators, including rates for cirrhosis of the liver, and it is pointed out that the interpretation of such data is hampered by the prevalence of undernutrition in Latin America. In addition, the results from some surveys are given, weighed according to Marconi's classification, which indicate that men consume more alcohol than women. Figures are also given for other indirect indicators in which the use of alcohol is involved with suicide, homicides, crimes and accidents.

In conclusion, mention is made of some programs being conducted by the Mexican Institute of Psychiatry for the treatment of alcoholism and deliberate inhalation in groups of minors, and the desire is expressed for more intensified collaboration with international agencies.

Figure 6. Postedited text in Figure 5 upgraded to publication quality.