

GENERAL REPORT OF THE COGNITIVE TESTING OF THE WCG

Contry: MEXICO

Institution: INSTITUTO NACIONAL DE ESTADÍSTICA, GEOGRAFÍA E
INFORMÁTICA, DIRECCIÓN GENERAL DE ESTADÍSTICA.

Contact: RITA VELAZQUEZ LERMA

BACKGROUND

As a result of the Fifth Meeting Washington Group (WG) on Disability Statistics, INEGI decided to carry out the application of the Cognitive Testing proposed by of the Group; the test was carried out from the 6th to June 10th, 2006; in 82 households distributed in two federative entities (Aguascalientes and Mexico City). In each household there was at least some person with disability. The expenses of the test were assumed by INEGI.

INTERVIEWERS

10 interviewers were used that work for INEGI, 4 were men and 6 were women with some experience in the topic and in the realization of interviews at households; the interviewers were distributed in the following form:

The educational level of the interviewers was the following: 7 interviewers have concluded professional's level and the other 3 have high school studies, all of them are Spanish speakers.

Table 1
Distribution of Interviewers by city, sex, and average age

City and sex	Total	Average Age
TOTAL	10	39.3
Man	4	39.5
Woman	6	39.2
AGUASCALIENTES	5	36.6
Man	1	37.0
Woman	4	36.5
MEXICO CITY	5	42.0
Man	3	40.3
Woman	2	44.5

TRAINING

An interviewer manual was developed, where the objectives of the test, the objectives of the questions, were precise. The instructions of filled; the recommendations to carry out the interview depending on the limitation type that the person manifested; recommendations for to carry out difficult cases and operative aspects. This manual was the main support material for the training.

The training to the interviewers was carried out in two days; during the first, the instrument, its instructions and application sequence were revised, in the second practical exercises of application of the instrument were carried out and explanation of doubts were done. Additionally it was carried out an exercise where each interviewer made the complete application in a real home.

Finally a meeting was done where in the problems and suggested doubts from the application were reviewed, the homogeneous procedures were settled down to not affect the test.

RESPONDENTS

The observation unit for the application of the interviews was the homes, the main condition was that every home must have at least one person with disability; in total 82 homes were visited and 326 interviews were carried out. In average 4 interviews were made by home; the average time of duration of the interview was 2 hours with 45 minutes.

In order to obtain the sample of home to interview, private and public institutions that work with and for the people with disability helped us. The distribution of the homes by type of disability was the following.

Table 2
Number of households by type of disability from State

Type of disability	Total	Federal Entity	
		Aguascalientes	México City
Total	82	48	34
Hearing	13	6	7
Physical	15	9	6
Intellectual	25	18	7
Dumb deaf person	9	6	3
Vision	20	9	11

As part of the instructions for the interviewer, considering the type of disability that could have the person was included a group of recommendations oriented to the conduction of the interview.

The homes were informed about the realization of the test and they accepted to participate in a voluntary way, once selected the homes, an appointment was

established. They defined the day and hour they wanted to be visited; we looked for that at the time and date of our visit the biggest number of habitants were at home.

The respondents' profile social - demographic

The results obtained from test are:-

Interview type

Each interviewed person's information was obtained in two ways:

- A. **Self report:** when the interview was made directly; that is to say the informant was present at home and answered all the questions of the interview
- B. **Proxy report:** this report applied to all the interviews in where for any reason the person (respondents) couldn't provide information at the moment of the interview and a person of legal age existed, who knew the respondent's information. It was applied in the following situations:
 - In the cases where some member of them couldn't be present (by personal reasons) to do the interview, It was possible that another member that knew the information answered its information of the absent person, in this case the interview was codified like proxy report.
 - When the person (respondents) suffered of severe disability that did not allow to respond the interview without help; in this case another person gave the information, in most of these cases the information it was provided by the parents or the person who is in charge of his or her care.
 - A third case was when the "informant" was a small child (babies and children under 6 years of age), who for obvious reasons they don't have the capacity to give its own answers, in this case near people as the parents, uncles or grandparents gave the information about them.

Unlike other countries; in Mexico all the interviews were made only once.

Of the 326 interviews carried out, in 223 were the same informant who provided their information (self report), and in 103 another person that knew their data starting from a proxy report; the information was provided it by a third person provided it (table 3).

Table 3
Respondent by type of report according to sex

Type Report	Total	Men	Women
Total	326	152	174
Self Report	223	93	130
Proxy Report	103	59	44

Sex and age

Of the 326 interviews carried out, 46.9% were made to men and 53.1% were made to women; The age group distribution shows that 16.9% the interviews were made to children of among 0 to 14 years old, 14.7% to people of 60 and more years, 23.6% to young population between 15 and 29 years and 44.5% to the population of 30 to 59 years.

Table 4
Population by quinquennial groups of age according to sex

Age	Total	Men	Women
Total	326	153	173
0 to 4 years	10	7	3
5 to 9 years	18	10	8
10 to 14 years	27	11	16
15 to 19 years	27	11	16
20 to 24 years	32	19	13
25 to 29 years	18	8	10
30 to 34 years	25	13	12
35 to 39 years	29	12	17
40 to 44 years	27	10	17
45 to 49 years	30	16	14
50 to 54 years	20	4	16
55 to 59 years	15	10	5
60 to 64 years	14	4	10
65 to 69 years	7	5	2
70 to 74 years	9	5	4
75 to 79 years	10	5	5
80 to 84 years	5	1	4
85 to 89 years	2	1	1
90 years and more	1	1	0

Education

The last degree of study of the interviewed people was asked at the time of the interview, 19,1% of them have equivalent studies of high school (average superior), 22,1% of them have smaller studies than primary education, 14,7% declared to have bachelor's or master's degree.

Table 5
Population and its distribution by level of instruction according to sex

Instruction Level	Total	%	Men	%	Women	%
Total	326.0	100.0	152.0	100.0	174.0	100.0
Without education	30.0	9.2	16.0	10.5	14.0	8.0
kindergarden	14.0	4.3	8.0	5.3	6.0	3.4
Primary education (incomplete)	58.0	17.8	23.0	15.1	35.0	20.1
Primary education (complete)	48.0	14.7	23.0	15.1	25.0	14.4
Junior high education (incomplete)	21.0	6.4	10.0	6.6	11.0	6.3
Junior high education (complete)	45.0	13.8	25.0	16.5	20.0	11.5
High-school	62.0	19.1	21.0	13.8	41.0	23.6
Bachelor's degree	44.0	13.5	23.0	15.1	21.0	12.1
Master's degree	4.0	1.2	3.0	2.0	1.0	0.6
Doctor's degree	0.0	0.0	0.0	0.0	0.0	0.0
No Answer/Don't Know	0.0	0.0	0.0	0.0	0.0	0.0

Marital Status

The results of the test showed that the respondents' 48.1% was single person, 42.4% was living with partner, 4.9% were widowers, and the rest was declared as divorced (2.5%) and separates (2.1%), the similar distribution is observed as much for the men as for women; for the case of divorced and widows the proportion is bigger in the women in relation to the men (table 6).

Table 6
Population's percentage distribution interviewed by marital status according to sex

	Total	Men	Women
Total	100.0	100.0	100.0
living with partner	4.0	4.6	3.4
Separates	2.1	1.3	2.9
Divorced	2.5	0.7	4.0
Widowers	4.9	3.3	6.3
Married			
<u>Only marriage</u>	8.0	9.2	6.9
Only married religious ceremony	0.3	0.0	0.6
Marriage and religious ceremony	30.1	30.9	29.3
Single	48.1	50.0	46.6
No Answer/Don't Know e	0.0	0.0	0.0

Main work status

The question of main work status includes a group of activities that allow to differentiate to population's group that carries out some work, of those that don't carry out some productive activity (from the approach of the active economic population); it is necessary to remember that this question was made to the whole population without

establishing population's subgroup; for the case of Mexico, the age considered to ask this question is the 12 years old

Table No.7 showed that 27.6% of the interviewed people declared that they worked for money, 10.4% declared as self employed (they own their business or farming) and 0.6% declared that they worked unpaid, in an indirect way, one can conclude that of those interviewed, and 38.6% are in the economically active population. By sex, it was observed that men outnumbered women in the first two categories

Table 7
Population's percentage distribution interviewed by main activity according to sex

	Total	Men	Women
Total	100.0	100.0	100.0
Paid work	27.6	35.0	21.3
Self employed, such as own your business or farming	10.4	11.8	9.2
Non paid work, such as volunteer or charity	0.6	0.0	1.2
Student	26.7	27.6	25.9
Keeping house/Homemaker	20.6	7.2	32.2
Retired	5.5	7.9	3.4
Unemployed (health reasons)	2.8	3.9	1.7
Unemployed (other reasons)	1.5	1.3	1.7
Others	4.3	5.3	3.4
No Answer/Don't Know	0.0	0.0	0.0

The other group of population is which doesn't work; the students represent 26,7% of the total of the population interviewed and the people stay in their house for some reason reach a proportion of 20.6% and 2.8% declared not to work for health reasons.

Household income

Mexico is a country that has high percentages of poverty; due to its sensitive nature this question was made until the end of the interview, it was wondered for the total amount of monthly income for the household in national currency, to the last one the conversion was made to Euro and it was classified according to the table that proposed by WCG.

The results show that 24.4% of the visited homes had a household income less than 150 monthly Euros. The same perceptual proportion was founded for the interval between 300-150 monthly Euros. Both ranges concentrated 43.8% of the interviewed population's. The highest household income interval that was identified was 2000-1500 monthly Euros. It was declared only in one home.

Table 8
Households and persons by groups of monthly income in euros

Household income	Household		Population	
	Total	Porcentaje	Total	Porcentaje
Total	82	100.0	326	100.0
less than 150 euros (J)	20	24.4	66	20.2
of 150 to less than 300 euros (R)	20	24.4	77	23.6
of 300 to less than 500 euros (C)	16	19.5	71	21.8
of 500 to less than 1000 euros (M)	19	23.2	84	25.9
of 1000 to less than 1500 euros (F)	6	7.3	22	6.7
of 1500 to less than 2000 euros (S)	1	1.2	6	1.8

QUESTIONNAIRE

The questionnaire maintained its original structure in its English version; but it was necessary to make some adjustments to the sections to assure their application and monitoring. In general terms were made three big changes to the questionnaire:

1. A section was elaborated for the household where we included the list of people in the household, some data demographic requested for the household in the cognitive testing and another information like control measurement.
2. It was necessary to make adjustments to the sections, when these were related with the use or not of any kind of equipment to be able to build the universes to which should be applied these specific questions,
3. A section related to the disability topic was added, where were included the questions of type and it causes of the disability that were used in the XII General Census of Population and Housing 2000 and we incorporated a question for the age that had the person at the beginning of the disability.

First change:

Lists of people in the household

For this section we used INEGI format to design its questionnaire; the following data are those that were asked the home:

- Geographical location
- Place of the interview
- Control of the household and questionnaire
- Lists of people in household
- Duration of the interview
- Name of the interviewer
- household income (monthly)
- The obligation clauses and confidentiality
- A section for observations

Second change:

Related with the original self report questionnaire of the WCG

Report type (self report and proxy report)

Instead of having two versions of the questionnaire (one for the self-report and another for the proxy report as it appears in the original version), it was identified the type of report by means of the following box at the beginning of the interview:

TIPO DE REPORTE	
REPORTE PERSONAL	1
REPORTE DELEGADO	2

In some of the questions about data of the informant slight modifications were made to adapt the questions to the national idioms, were used already proven questions in the Count of Population and House 2005, the modified questions were the following ones:

Educational level

Original structure WCG:

2. **How many years in all did you spend studying in school, college or university?** Years _____

Adaptation for Mexico:

<p>1.4 ¿Hasta qué año o grado aprobó en la escuela? <small>ANOTE CON NÚMERO EL ÚLTIMO GRADO EN EL NIVEL CORRESPONDIENTE</small></p>	<p>Ninguno (ANOTE '0') 00 Preescolar 01 Primaria 02 Secundaria 03 Preparatoria o bachillerato 04 Normal 05 Carrera técnica o comercial 06 Profesional 07 Maestría 08 Doctorado 09 No sabe o no responde 99</p>
---	--

The last grade studied by respondent in this question was identified, with the levels of the educational system that exists in Mexico.

Household income

Original structure WCG:

5. **What is your household income?** (See card) (J, C, M, F, S, K, P, D, H, U, N)

Adaptation for Mexico:

<p>¿Cuál es el ingreso mensual de este hogar?</p> <p>ANOTE EN PESOS LA CANTIDAD RECIBIDA SI NO RECIBE INGRESOS ANOTE "0"</p> <p>ANOTE CON NÚMERO</p>	
--	--

This question is considered by us very sensitive, for that reason it we decided to use the question of the Census; we asked for the total amount of income of the home in the month previous to the interview in national currency and later the conversion to Euros was done and was classified according to the propose table by the WCG.

Construction of application universes (domains)

For every domain of the test and according to the sequence of the interview, were constructed different subgroups to the interior, depending on if they use or no aids or equipment; in these cases were done a review careful and we decided to divide in sections. These same changes applied in similar sections, the vision dominion serves like example.

Original structure WCG:

1. (VSVISION) **Do you have difficulty seeing, even if wearing glasses?**

- No, No difficulty** (0)
- Yes, Some difficulty** (1)
- Yes, A lot of difficulty** (2)
- Can not do at all** (3)

No Answer/Don't Know (9)

1. (VSWHY) Why did you answer that way?

2. (VSGLASS) Do you wear glasses all of the time, only for certain activities, or none of the time?

All of the time (2) Certain activities (1) None of the time (0) *No Answer/Don't Know* (9)

3 – 4 Only if Respondent Reported Any Difficulty Seeing:

3. (VSDIFF) [Without your glasses], how often do you have difficulty seeing well?

- Never (0)
- Somewhat often (1)
- Very often (2)
- No Answer/Don't Know* (9)

Glasses wearers only:

3a. (VSDIFFG) With your glasses, how often do you have difficulty seeing well?

- Never (0)
- Somewhat often (1)
- Very often (2)
- No Answer/Don't Know* (9)

4. (VSEFF) [Without your glasses], when you are having difficulty, how much effort do you have to put into seeing?

- No effort (0)
- Some effort (1)
- A lot of effort (2)
- No Answer/Don't Know* (9)

Glasses wearers only:

- 4a. (VSEFFG) With your glasses, how much effort do you have to put into seeing?
 No effort (0)
 Some effort (1)
 A lot of effort (2)
 No Answer/Don't Know (9)

Adaptation for Mexico:

Due to the experience that the Institute has in questionnaire design, it was possible to determine that with this structure proposed by WCG, the sequence of the interview was difficult to follow and it was possible to commit mistakes during the application, so it was necessary to separate the sections in order to make easier for the interviewer the tracking of the interview. Changes made the instrument a little longer but easier to fill.

II. VISIÓN	
<i>SECCIÓN B. PRINCIPAL</i>	
2.1 ¿Tiene dificultad para ver, aunque use anteojos o lentes de contacto? <small>LEA LAS OPCIONES HASTA OBTENER UNA RESPUESTA</small>	No, sin dificultad 0 Sí, con poca dificultad 1 Sí, con mucha dificultad 2 No puede ver 3 No sabe o no responde 9
2.2 ¿Necesitó que le repitieran alguna parte de la pregunta? <small>CIRCULE UN SOLO CÓDIGO</small>	Sí 1 No 2
2.3 ¿Tuvo alguna dificultad al escoger las opciones de respuesta? <small>CIRCULE UN SOLO CÓDIGO</small>	Sí 1 No 2
2.4 ¿Preguntó para aclarar o confirmar su respuesta? <small>CIRCULE UN SOLO CÓDIGO</small>	Sí 1 No 2
2.5 ¿Porqué dice que (RESPUESTA DE 2.1)? <small>ANOTE TEXTUALMENTE LA RESPUESTA</small>	_____ _____ _____
2.6 FILTRO <small>SÍ PREGUNTA 2.1 = 3, PASE A SECCIÓN E</small>	┌───┐ RESPUESTA DE 2.1
2.7 Utiliza anteojos o lentes de contacto... <small>LEA LAS OPCIONES HASTA OBTENER UNA RESPUESTA</small>	todo el tiempo 2 } PASE A SECCIÓN C para ciertas actividades 1 } no usa 0 No sabe o no responde 9
2.8 FILTRO <small>SÍ PREGUNTA 2.1 = 1 Ó 2, PASE A SECCIÓN D</small> <small>SÍ PREGUNTA 2.1 = 0 Ó 9, PASE A SECCIÓN E</small>	┌───┐ RESPUESTA DE 2.1

SECCIÓN C. SÓLO SI EL INFORMANTE USA LENTES

Ahora le voy a hacer unas preguntas de cuando USA SUS LENTES

<p>3.1 ¿Con qué frecuencia tiene dificultad para ver bien? <i>LEA LAS OPCIONES HASTA OBTENER UNA RESPUESTA</i></p>	<p>Nunca 0 A veces 1 Casi siempre (frecuentemente) 2 No sabe o no responde 9</p>
<p>3.2 ¿Qué tanto se tiene que esforzar para ver bien? <i>CIRCULE UN SOLO CÓDIGO</i></p>	<p>No se esfuerza 0 Se esfuerza poco 1 Se esfuerza mucho 2 No sabe o no responde 9</p>
<p>3.3 ¿Tiene dificultad para leer las letras en un mapa, periódico o libro? <i>CIRCULE UN SOLO CÓDIGO</i></p>	<p>No, sin dificultad 0 Sí, poca dificultad 1 Sí, mucha dificultad 2 No lo puede hacer 3 No sabe o no responde 9</p>
<p>3.4 ¿Tiene dificultad para ver e identificar a una persona conocida a 7 metros de distancia? (aproximadamente 11 pasos) <i>CIRCULE UN SOLO CÓDIGO</i></p>	<p>No, sin dificultad 0 Sí, poca dificultad 1 Sí, mucha dificultad 2 No lo puede hacer 3 No sabe o no responde 9</p>

SECCIÓN D. SÓLO SI EL INFORMANTE TIENE ALGUNA DIFICULTAD PARA VER

ACLARE A LOS QUE USAN LENTES: Ahora le voy a hacer unas preguntas de cuando NO USA SUS LENTES

<p>4.1 ¿Con qué frecuencia tiene dificultad para ver bien? <i>LEA LAS OPCIONES HASTA OBTENER UNA RESPUESTA</i></p>	<p>Nunca 0 A veces 1 Casi siempre (frecuentemente) 2 No sabe o no responde 9</p>
<p>4.2 Cuando tiene problemas para ver ¿cuánto se esfuerza? <i>CIRCULE UN SOLO CÓDIGO</i></p>	<p>No se esfuerza 0 Se esfuerza poco 1 Se esfuerza mucho 2 No sabe o no responde 9</p>
<p>4.3 ¿Tiene dificultad para leer las letras en un mapa, periódico o libro? <i>CIRCULE UN SOLO CÓDIGO</i></p>	<p>No, sin dificultad 0 Sí, poca dificultad 1 Sí, mucha dificultad 2 No lo puede hacer 3 No sabe o no responde 9</p>
<p>4.4 ¿Tiene dificultad para ver e identificar a una persona conocida a 7 metros de distancia? (aproximadamente 11 pasos) <i>CIRCULE UN SOLO CÓDIGO</i></p>	<p>No, sin dificultad 0 Sí, poca dificultad 1 Sí, mucha dificultad 2 No lo puede hacer 3 No sabe o no responde 9</p>

Third change:

Inclusion of a new section about Disability

Imitating the model of the questionnaire of the WCG, were added at the end of the questionnaire the questions used in Mexico the XII General Census of Population and Housing 2000 in order to identify to the disability and the origin, including also the questions of the gray area (Interviewer Coding), proposed by the WCG.

Also a question was included about the age to the beginning of the disability that was proven in Mexico in a survey of health in the year 2000.

IX. DISCAPACIDAD	
SECCIÓN Y. DISCAPACIDAD	
25.1 ¿Tiene limitación para... <small>CIRCULE LAS RESPUESTAS AFIRMATIVAS</small>	moverse, caminar o lo hace con ayuda? 1 usar sus brazos y manos? 2 ¿Es sordo(a) o usa un aparato para oír? 3 ¿Es mudo(a)? 4 ¿Es ciego(a) o sólo ve sombras? 5 ¿Tiene algún retraso o deficiencia mental? 6 ¿Tiene otra limitación física o mental? _____ 7 <small>ESPECIFIQUE</small> ¿Entonces no tiene limitación física o mental? 8
25.2 ¿Necesitó que le <u>repetieran</u> alguna parte de la pregunta? <small>CIRCULE UN SOLO CÓDIGO</small>	Sí 1 No 2
25.3 ¿Tuvo alguna dificultad al <u>escoger</u> las opciones de respuesta? <small>CIRCULE UN SOLO CÓDIGO</small>	Sí 1 No 2
25.4 ¿Preguntó para <u>aclarar o confirmar</u> su respuesta? <small>CIRCULE UN SOLO CÓDIGO</small>	Sí 1 No 2
25.5 ¿Porqué dice que (RESPUESTA DE 25.1)? <small>ANOTE TEXTUALMENTE LA RESPUESTA</small>	_____ _____ _____
25.6 FILTRO <small>SI PREGUNTA 25.1 = 8, TERMINE ENTREVISTA</small>	┌───┐ RESPUESTA DE 25.1
SECCION Z. SOLO SI EL INFORMANTE TIENE ALGUNA DISCAPACIDAD	
26.1 ¿Tiene esta limitación... <small>LEA HASTA OBTENER UNA RESPUESTA AFIRMATIVA Y CIRCULE UN SOLO CÓDIGO</small>	porque nació así? 1 por una enfermedad? 2 por un accidente? 3 por edad avanzada? 4 por otra causa? _____ 5 <small>ESPECIFIQUE</small>
26.2 ¿Necesitó que le <u>repetieran</u> alguna parte de la pregunta? <small>CIRCULE UN SOLO CÓDIGO</small>	Sí 1 No 2

26.3 ¿Tuvo alguna dificultad al <u>escoger</u> las opciones de respuesta? <i>CIRCULE UN SOLO CÓDIGO</i>	Sí 1 No 2
26.4 ¿Preguntó para <u>aclarar o confirmar</u> su respuesta? <i>CIRCULE UN SOLO CÓDIGO</i>	Sí 1 No 2
26.5 ¿Porqué dice que (RESPUESTA DE 26.1)? <i>ANOTE TEXTUALMENTE LA RESPUESTA</i>	_____ _____ _____
26.6 ¿Qué edad tenía cuando comenzó su limitación? <i>ANOTE CON NÚMERO</i>	_____ <small>MENOR A UN AÑO, ANOTE 000</small>
26.7 ¿Necesitó que le <u>repitieran</u> alguna parte de la pregunta? <i>CIRCULE UN SOLO CÓDIGO</i>	Sí 1 No 2
26.8 ¿Preguntó para <u>aclarar o confirmar</u> su respuesta? <i>CIRCULE UN SOLO CÓDIGO</i>	Sí 1 No 2

TRANSLATION OF THE QUESTIONNAIRE

The interviews were only carried out in the Spanish language, the population object studied only spoke this language, and therefore there was not necessity to apply it in another language or indigenous language.

The translation was done by personnel of INEGI that has an appropriate knowledge in English of the topic. The process to carry out the translations was the following:

- Two independent translations of the questionnaire were carried out of that the WCG send us.
- A third version was built from the two translations. This was modified again when considering the concepts used in the ICF (International Classification of Functioning, Disability and Health), some tests were carried out to evaluate their understanding.
- A fourth translation was obtained from the observations received by the expert personnel in the instrument design, and its doubts. We returned to the original questionnaire and the ICF to made the necessary changes

A small test to co-workers and neighbors were made during the second and quarter version of translation, with the objective of identifying the clarity of the concepts used and the writing of the questions, these tests led us to modify some part of the questionnaires like writings of questions and options of answers.

Additionally, it was carried out an exercise where each interviewer would have to make application in a real home; this exercise helped to precise especially some operative procedures from the application of the questionnaire.

The main problems and difficulties that appeared in the process of the translations were due to the meaning of some words. Some words used in English questionnaire didn't correspond to those used in Spanish language, like technical terms, regionalisms and own questions about characteristic of the application; this last we consult it directly with those in charge of the WCG, them specify some operative questions and through the versions, we were adjusting and adapting to the Spanish language to be able to

receive the informant's correct answer. Following a description is given of these problems:

Questions for the interviewer

- In the shaded boxes of the original version said: *Did the respondent ask for clarification or qualify their answer?*, the literal translation of the verb *qualify* it is confused, for what the translation adapted in the following way: *Did the respondent ask to clarify or to confirm their answer?*; where the verb "confirm" gives us some evaluation or qualification that could make the informant of its answer

Vision

- The term *Wearing glasses*, in our language only refers to the eyeglasses or glasses, we had to add the *contact eyeglasses* to be more explicit
- In the question: *How concerned or worried are you about your vision?*; limits its global meaning, to be able to make reference on the abilities of the sense of the view, the word that were used was: *ability to see*.

Hearing

- The question: *Do you wear a hearing aid all of the time, only for certain activities, or none of the time?*, in the question are included the answer options, it was made extensive and repetitive; to avoid this situation, the first part of the question was equal: *Do you wear a hearing ...?*, (with ellipsis) and the rest of question were left in the answer options.
- This same procedure was used in the questions of the other chapters that were in the same situation.
- In the sentence *"In to crowded room? "*, "room" refer to a type of physical space (for example the room of a house), so that the informant kept in mind that it could be in any physical space, not alone a "room", this word changes by "place". The same happened in the sentence "quiet room", it changes by "quiet place."

Cognitive

This was one of the chapters more difficult of all the considered domains, as much for the translation and as for the application.

- The expression COGNITIVE, is not a term that know all the people and besides includes several mental processes; therefore we decided to use synonym of two cognitive more important functions: the concentration and memory that are derived of the ICF (section Activities and participation, chapter 1 Learning and applying knowledge) and of the type of reagents that are included in the original version; also it's easier of understanding for most of people.
- The expression "older" it was changed by "age".

Lower Mobility

- In general more examples were included of the kind of equipment that the person can use.

Self care

- The expression "washing all over" it was changed by the activity that implies "to take a bath."
- To know that specific movement referred the question: *Reaching out as if to shake someone's hand?* was it appealed the ICF, where the movement was identified (to stretch the hand) and by this was asked.
- The question: Does have difficulty using your hands and fingers, such as picking up small objects or opening or closing containers?, it cause doubt if it really belonged to this block because it make more reference to the mobility of the members than to the self-care, it was also to look up the ICF to confirm their location.
- In special, in this chapter were used expressions and examples as commonly the people name or know them (to go bathroom, to fasten the blouse, to bathe, etc.)

Communication

- The problem was during the translation because the questions became too long sentences and this was so tired for interviewers and respondents.

Health

- For the following sufferings were necessary to consult medical dictionaries and the ICD-10 (International Classification of Diseases):
 1. (GSCOND) Do you have any of the following conditions?
 - ‡Asthma/breathing problem (1)
 - ‡Arthritis/rheumatism (2)
 - ‡Fracture, bone/joint injury (4)
 - ‡Missing limbs, amputee (13)

Operative aspects

- It was necessary to request explanation to WCG on which situations the Proxy report had to be applied
- Some explanations were requested to WCG about if the interview was applied to all the persons at home, if there were a limits age (inferior and superior) and the reference period for some variables; these aspects are not including in the original version of the questionnaire.

During the process of translation of the instrument, the English concepts and terms had to be adjusted and adapted to be suitable in Spanish. In these cases, ICF was of great help and was consulted frequently; the internal descriptions of each area helped to identify with greater clarity the type of activity referenced by the concept in English.

For to apply chapter IV Cognitive, in some interviews was necessary to make adaptations to the questions; the reasons were the following ones:

- the questions were difficult to understand for some respondents,
- sounded repetitive, and
- The questions were too long to the reading.

QUALITY OF THE DATA

The general comment of the interviewers was that the application of the cognitive test turned out to be too long and tired because the same structure of questions was repeated in each section (domain); the main difficulties that they reported are the following ones:

Section of general data: in the questions about condition of main work status and marital status is necessary to include passes to differ and establish universes (according to the age) they should be carried out.

Core questions: Some times the respondents didn't wait for the complete reading of the answer's options and they answered something like that: "I don't have any problem", "I can see well", "I can hear or to listen well", "I don't have difficulty", "I am healthy", etc.

For each section (domain) is necessary to put filters depending on the respondent's age and their answer of the core question

Hearing section (question 9.6): *How often do you miss words in conversation or on the radio or television because you have difficulty hearing?*, the respondent's interpretation was in affirmative form: *How often do you listen well some words in conversation or on the radio or television because you have difficulty hearing?*, in some cases was necessary to repeat the question. For questionnaires in Spanish is recommended to change the writing in affirmative form for to reduce the mistake.

Lower mobility: When the respondent had some medullar lesion (kind of sclerosis or severe problems of lower mobility) in some cases the respondent showed surprise when we were applied some of the questions that make reference to moving around inside or outside their home. It's recommended to include filters for not applied the questions about mobility (with or without using equipment). Of equal form happened to the questions about the displacement ability (question 16.6 to 16.11).

Self-care: when the respondent was smaller than 4 years, he/she could not be carried out the activity or was carried out with a lot of effort, these answers were not indicative of limitation in the ability, since they were consequence of her/his development level and growth; for these situations is recommended to include filters.

Questions proven in Mexico about disability: In some cases the questions turned out to be repetitive, the respondent since during the course of the interview had deepened already on his/her limitation and the causes of the same ones, this situation produced in most of the cases, only the confirmation of the limitation

Quantitative analysis

With the objective to evaluate the relation between the core questions and the identified types of disability in the Census of year 2000 in Mexico, an statistical exercise of being able was made the objective of this one was to know the significant correspondence with its similar in each case. In order to be able to make the exercise its relation with the types of disability was defined in each basic question that could have correspondence or relation; hypotheses were established, later the statistical test of correlation was chosen and the hypotheses were evaluated from the results. Following appear the results for each domain.

Vision

The relation of the following variables was analyzed to know if correspondence between them exists:

- **VSVISION. Do you have difficulty seeing, even if wearing glasses?**
- **Type5 Are you blind or see shades only?**

Ho: The variables *Vsvision* and *Type5* have significant relation

Hi: The variables *Vsvision* and *Type5* don't have significant relation

Justification:

The question *VSVISION* has objective to know if the respondent considers that some visual limitation has or not although uses glasses or contact eyeglasses and the *Type5* measures the individual's severe visual limitations.

Vsvision * type5

Crosstab

			type5		Total
				5	
vsvision	0	Count	181	0	181
		% within type5	60.5%	.0%	55.5%
	1	Count	94	2	96
		% within type5	31.4%	7.4%	29.4%
	2	Count	24	5	29
		% within type5	8.0%	18.5%	8.9%
	3	Count	0	20	20
		% within type5	.0%	74.1%	6.1%
Total		Count	299	27	326
		% within type5	100.0%	100.0%	100.0%

Symmetric Measures

		Value	Approx. Sig.
Nominal by	Phi	.868	.000
Nominal	Cramer's V	.868	.000
N of Valid Cases		326	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The variables *VSVISION* and *Type5* have a **high and symmetrical correlation**, with $r = 0.868$. This result permit concluded that exist a significant relation between the variables, Ho is accepted (the variables *Vsvision* and *Type5* have significant relation)

Hearing

The relation of the following variables was analyzed to know if correspondence between them exists:

- **HSHEAR Do you have difficulty hearing, even if using a hearing aid?**
- **Type3 Are you deaf or it use hearing aid?**

Ho: The variable *Hshear* and Type3 have significant relation

Hi: The variable *Hshear* and Type3 don't have significant relation

Justification:

The question *HSHEAR* has objective to identify if the respondent has some auditory deficiency using or not a hearing aid and the *Type3* consider if the individual has limitation auditory type deafness or if it uses some hearing aid.

hshear * type3

Crosstab

			type3		Total
				3	
hshear 0	Count	240	0	240	
	% within type3	82.8%	.0%	73.6%	
1	Count	39	9	48	
	% within type3	13.4%	25.0%	14.7%	
2	Count	11	12	23	
	% within type3	3.8%	33.3%	7.1%	
3	Count	0	15	15	
	% within type3	.0%	41.7%	4.6%	
Total	Count	290	36	326	
	% within type3	100.0%	100.0%	100.0%	

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.770	.000
	Cramer's V	.770	.000
N of Valid Cases		326	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The variables *HSHEAR* and *Type3* have a **high and symmetrical correlation**, with **r=0.770**. This result permit concluded that exist a significant relation between the variables, Ho is accepted (the variable *Hshear* and Type3 have significant relation)

Cognitive

The relation of the following variables was analyzed to know if correspondence between them exists:

- **CSCOG Do you have difficulty remembering or concentrating?**
- **Type6 Have you as some retardation or mental deficiency?**

Ho: The variables *CSCOG* and *Type6* have significant relation

Hi: The variables *CSCOG* and *Type6* don't have significant relation

Justification:

The question *CSCOG* has objective to know if the respondent considers that has some difficulty to remember or to concentrate and the *Type6* considers if the respondent has of some retardation or mental deficiency.

cscog * type6

Crosstab

		type6		Total
			6	
cscog 0	Count	190	7	197
	% within type6	62.3%	33.3%	60.4%
1	Count	89	4	93
	% within type6	29.2%	19.0%	28.5%
2	Count	23	10	33
	% within type6	7.5%	47.6%	10.1%
3	Count	2	0	2
	% within type6	.7%	.0%	.6%
9	Count	1	0	1
	% within type6	.3%	.0%	.3%
Total	Count	305	21	326
	% within type6	100.0%	100.0%	100.0%

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.327	.000
	Cramer's V	.327	.000
N of Valid Cases		326	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The variables *CSCOG* and *Type6* have a **weak and symmetrical correlation**, with **r=0.327**. This result permit concluded that not exist a significant relation between the variables, Hi is accepted (the variables *CSCOG* and *Type6* don't have significant relation).

Lower Mobility

The relation of the following variables was analyzed to know if correspondence between them exists:

- **MSWALK. Do you have difficulty walking or climbing steps?**
- **Type1 have you limitation to move, to walk or it does with aid?**

Ho: The variables *MSWALK* and *Type1* have significant relation

Hi: The variables *MSWALK* and *Type1* don't have significant relation

Justification:

The question MSWALK has objective to know if the respondent has difficulty to walk or to go up stairways and the question Type 1, identifies if the respondents have limitation in the inferior members to move or to walk or makes with help.

mswalk * type1

Crosstab

			type1		Total
				1	
mswalk	0	Count	247	4	251
		% within type1	84.6%	11.8%	77.0%
	1	Count	35	9	44
		% within type1	12.0%	26.5%	13.5%
	2	Count	8	7	15
		% within type1	2.7%	20.6%	4.6%
	3	Count	1	14	15
		% within type1	.3%	41.2%	4.6%
	9	Count	1	0	1
		% within type1	.3%	.0%	.3%
Total		Count	292	34	326
		% within type1	100.0%	100.0%	100.0%

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.695	.000
	Cramer's V	.695	.000
N of Valid Cases		326	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The variables *MSWALK* and *Type1* present a **high and symmetrical correlation**, with **$r = 0.695$** . This result permit concluded that exist a significant relation between the variables, Ho is accepted (the variables *MSWALK* and *Type1* have significant relation).

Communication

Of the following variables, the relation was analyzed to know if correspondence between them exists:

- **TSCOMM. Because of a physical, mental or health condition, do you have difficulty communicating, for example understanding or being understood by others?**
- **Type3 Are you deaf or it uses an apparatus to hear?**

Ho: The variables *TSCOMM* and *Type3* have significant relation

Hi: The variables *TSCOMM* and *Type3* don't have significant relation

Justification:

The question *TSCOMM* has objective to know if the respondent has difficulty communicate because of a physical, mental or health condition and the *Type3* considers if the individual has limitation auditory type deafness or if uses some hearing aid.

tscomm * type3

Crosstab

			type3		Total
			0	3	
tscomm	0	Count	236	9	245
		% within type3	81.4%	25.0%	75.2%
	1	Count	36	14	50
		% within type3	12.4%	38.9%	15.3%
	2	Count	17	10	27
		% within type3	5.9%	27.8%	8.3%
	3	Count	1	3	4
		% within type3	.3%	8.3%	1.2%
Total		Count	290	36	326
		% within type3	100.0%	100.0%	100.0%

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.441	.000
	Cramer's V	.441	.000
N of Valid Cases		326	

- Not assuming the null hypothesis.
- Using the asymptotic standard error assuming the null hypothesis.
- Correlation statistics are available for numeric data only.

The variables *TSCOMM* and *Type3* presented a **weak and symmetrical correlation**, with **r=0.441**. This result permit concluded that not exist a significant relation between the

variables, H_0 is accepted (the variables *TSCOMM* and *Type3* don't have significant relation).

For this domain, another group of relations of variables were the following ones:

- ***TSCOMM*. Because of a physical, mental or health condition, do you have difficulty communicating, for example understanding or being understood by others?**
- ***Type4* Are you dumb?**

H_0 : The variable *TSCOMM* and *Type4* have significant relation

H_1 : The variable *TSCOMM* and *Type4* don't have significant relation

Justification:

The question *TSCOMM* has objective to know if the respondent has difficulty to communicate because of a physical, mental or health condition and the *Type4* considers if the person is dumb.

tscomm * type4

Crosstab

			type4		Total
			0	4	
tscomm	0	Count	244	1	245
		% within type4	77.2%	10.0%	75.2%
	1	Count	48	2	50
		% within type4	15.2%	20.0%	15.3%
	2	Count	22	5	27
		% within type4	7.0%	50.0%	8.3%
	3	Count	2	2	4
		% within type4	.6%	20.0%	1.2%
Total		Count	316	10	326
		% within type4	100.0%	100.0%	100.0%

Symmetric Measures

		Value	Approx. Sig.
Nominal by	Phi	.419	.000
Nominal	Cramer's V	.419	.000
N of Valid Cases		326	

- Not assuming the null hypothesis.
- Using the asymptotic standard error assuming the null hypothesis.
- Correlation statistics are available for numeric data only.

The variable *TSCOMM* and *Type4* present a **weak and symmetrical correlation**, with **$r=0.419$** . This result permit concluded that not exist a significant relation between the variables, H_0 is accepted (the variable *TSCOMM* and *Type4* don't have significant relation)

For this domain, another variable relation is the following one:

- **TSCOMM. Because of a physical, mental or health condition, do you have difficulty communicating, for example understanding or being understood by others?**
- **Type6 have you some deficiency or mental retardation?**

Ho: The variable *TSCOMM* and *Type6* have significant relation

Hi: The variable *TSCOMM* and *Type6* don't have significant relation

Justification:

The question *TSCOMM* has objective to know if the respondent has difficulty to communicate because of a physical, mental or health condition and the *Type6* considers if the respondent has of some retardation or mental deficiency.

tscomm * type6

Crosstab

			type6		Total
			0	6	
tscomm	0	Count	242	3	245
		% within type6	79.3%	14.3%	75.2%
	1	Count	43	7	50
		% within type6	14.1%	33.3%	15.3%
	2	Count	16	11	27
		% within type6	5.2%	52.4%	8.3%
	3	Count	4	0	4
		% within type6	1.3%	.0%	1.2%
Total		Count	305	21	326
		% within type6	100.0%	100.0%	100.0%

Symmetric Measures

		Value	Approx. Sig.
Nominal by	Phi	.459	.000
Nominal	Cramer's V	.459	.000
N of Valid Cases		326	

- Not assuming the null hypothesis.
- Using the asymptotic standard error assuming the null hypothesis.
- Correlation statistics are available for numeric data only.

The variable *TSCOMM* and *Type6* presented a **moderate and symmetrical correlation**, with $r = 0.459$ this result permit concluded that exist a moderate relation between the variables, Ho is accepted (The variable *TSCOMM* and *Type6* have significant relation)

Conclusion:

- For the core questions of vision, hearing and lower mobility and the question used in 2000 by Mexico for the same areas, the similar information is received; this gives reliable to both (core questions and the used in Mexico).
- For the core questions of communication and cognition are different, because don't have high correlations, therefore they aren't reliable.

RESULTS

To analyze the obtained information of the test 39 tables were designed to carry out the crossings of information among the variables, at the moment we work in the analysis of the table. An advance of the analysis emphasizes the following ones:

Distribution for domains (core question)

In the table 9 is observed than more than 50% of interviewed people declared, for all the domains, not to present some difficulty. The percentage more high is located in the domain of Self-care (88.0%) and the lowest in vision (55.5%), it is interesting to observe as the grade of the limitation increases and the affected population's proportion diminishes, the highest differences are observed in the cognitive and communication domains.

Table 9
Percentage distribution of people by domain according to the type of answer (N'=326)

Domain	Total	No, No difficulty	Yes, Some difficulty	Yes, A lot of difficulty	Can not do at all	No Answer/ Don't Know
Vision	100.0	55.5	29.5	8.9	6.1	0.0
Hearing	100.0	73.6	14.7	7.1	4.6	0.0
Cognitive	100.0	60.4	28.5	10.2	0.6	0.3
Lower mobility	100.0	77.0	13.5	4.6	4.6	0.3
Self-care	100.0	88.0	6.8	4.0	0.9	0.3
Communication	100.0	75.2	15.3	8.3	1.2	0.0

Another analysis type that was carried out was to cross the information for each domain that people answered in the question about the general health.

Vision

The relation on degree of limitation of a dominion and its condition of health, allow of indirect form to relate the ability of the person with the perception that it has on how this ability affects its condition of health.

In table No. 10 a similar tendency is observed among people that declared to have a little difficulty to see and those that have a lot of difficulty, who consider as very good or good its own health; however, when the difficulty to see is bigger. We did not find cases were the interviewed person consider its condition of health fair or poor; when the

person declared that he/she cannot see, 60% of these cases qualifies its condition of health like very good or good and 25% among to fair and poor.

Table 10
Percentage distribution of people by conditions of health according to vision (N'=326)

Condition Health	V i s i o n				
	No, No difficulty	Yes, Some difficulty	Yes, A lot of difficulty	Can not do at all	No Answer/ Don't Know
General health	100.0	100.0	100.0	100.0	0.0
Excellent	1.7	4.2	10.4	15.0	0.0
Very good	18.8	33.3	37.9	40.0	0.0
Good	43.6	40.6	51.7	20.0	0.0
Fair	19.9	11.5	0.0	15.0	0.0
Poor	16.0	10.4	0.0	10.0	0.0
No Answer/ Don't Know	0.0	0.0	0.0	0.0	0.0

Hearing

In the core question of hearing, it is observed that in the cases where people declared that they had a little difficulty to listen, 77.1% of them consider its condition of health very good or good and only 14.6% like fair or poor. When the difficulty to listen is bigger, the distribution is modified and 13% of them qualify its health like to fair and 8.7% as poor. These percentages are increased in people that cannot listen, 46.7% of them report a condition of very good or good health and, 26.7% as poor.

Table 11
Percentage distribution of people by conditions of health according to hearing (N'=326)

Condition Health	H e a r i n g				
	No, No difficulty	Yes, Some difficulty	Yes, A lot of difficulty	Can not do at all	No Answer/ Don't Know
General health	100.0	100.0	100.0	100.0	0.0
Excellent	2.5	8.3	8.7	6.6	0.0
Very good	22.1	41.7	34.8	26.7	0.0
Good	44.2	35.4	34.8	40.0	0.0
Fair	18.3	6.3	13.0	0.0	0.0
Poor	12.9	8.3	8.7	26.7	0.0
No Answer/ Don't Know	0.0	0.0	0.0	0.0	0.0

Cognitive

In people that reported to have a little difficulty to concentrate or to remember, 41.9% of them qualifies its condition of health like good and 37.6% as to fair, in people that reported to have a lot of difficulty the fair health category is increased up to 48.5%, an increase was also observed in the category of poor conditions of health; for the case of

people that they can not remember or to concentrate, 50% declared a good health and the other 50% a poor health condition.

We should not forget that this question was made to all the people and that in the case of small children, it is possible that they answered that cannot remember and to concentrate because they don't speak or because its development level in not complete.

Table 12
Percentage distribution of people by conditions of health according to Cognitive (N'=326)

C o g n i t i v e					
Condition Health	No, No difficulty	Yes, Some difficulty	Yes, A lot of difficulty	Can not do at all	No Answer/ Don't Know
General health	100.0	100.0	100.0	100.0	100.0
Excellent	16.8	6.5	3.0	0.0	100.0
Very good	19.8	10.8	3.0	0.0	0.0
Good	43.7	41.9	33.4	50.0	0.0
Fair	17.2	37.6	48.5	0.0	0.0
Poor	2.5	3.2	12.1	50.0	0.0
No Answer/ Don't Know	0.0	0.0	0.0	0.0	0.0

Lower Mobility

For the population that declared to have a lot of difficulty to move or that cannot walk or up stairways, we emphasize that there were not reports about excellent condition of health. On the other hand, 47.7% people declared a little difficulty qualifies its health like to fair; a similar percentage, is observed in people that have a lot of difficulty and for the group of people that they cannot walk or to go up stairways, 20% of them answered to have a regular health and 26.7% qualified their health as poor.

Table 13
Percentage distribution of people by conditions of health according to lower mobility (N'=326)

L o w e r M o b i l i t y					
Condition Health	No, No difficulty	Yes, Some difficulty	Yes, A lot of difficulty	Can not do at all	No Answer/ Don't Know
General health	100.0	100.0	100.0	100.0	100.0
Excellent	15.2	4.6	0.0	0.0	100.0
Very good	18.3	4.5	6.6	6.6	0.0
Good	43.4	34.1	40.0	46.7	0.0
Fair	21.5	47.7	46.7	20.0	0.0
Poor	1.6	9.1	6.7	26.7	0.0
No Answer/ Don't Know	0.0	0.0	0.0	0.0	0.0

Self-care

This question presents the following complexity: it was applied the whole population without considering that small children don't have the development level to be able to take a shower by themselves; for such reason, some of the answers of this category of "he/she cannot make it" are affected by this situation.

According to the results, more than 50% of people that declared a little difficulty on their self-care, they qualify their health like very good or good, 31.9% as to fair and 13.6% as poor; these last two categories are increased for the population that has a lot of difficulty (23.1% for both) and for the population that cannot do it (33.3% for both).

Table 14
Percentage distribution of people by conditions of health according to self-care (N'=326)

Condition Health	Self-care				
	No, No difficulty	Yes, Some difficulty	Yes, A lot of difficulty	Can not do at all	No Answer/ Don't Know
General health	100.0	100.0	100.0	100.0	100.0
Excellent	13.6	0.0	0.0	33.4	100.0
Very good	16.0	13.6	7.7	0.0	0.0
Good	42.5	40.9	46.1	0.0	0.0
Fair	25.8	31.9	23.1	33.3	0.0
Poor	2.1	13.6	23.1	33.3	0.0
No Answer/ Don't Know	0.0	0.0	0.0	0.0	0.0

Communication

As in self-care domain, it is very possible that some bias exists in the communications distributions because it was applied the whole population including the small children.

The results show that the group of people that reported little difficulty to communicate so 40.0% qualifies its health like good, 44% as to fair and 10% as poor; in the group of people with a lot of difficulty, 37.1% has good condition of health, 44.4% fair and just 3.7% poor; while, in the group of people that cannot communicate, 25% reports excellent health, 50% to fair and 25 poor%.

Table 15

Percentage distribution of people by conditions of health according to communication (N'=326)

Condition Health	C o m m u n i c a t i o n				
	No, No difficulty	Yes, Some difficulty	Yes, A lot of difficulty	Can not do at all	No Answer/ Don't Know
General health	100.0	100.0	100.0	100.0	0.0
Excellent	14.3	6.0	7.4	25.0	0.0
Very good	19.6	0.0	7.4	0.0	0.0
Good	43.7	40.0	37.1	0.0	0.0
Fair	20.0	44.0	44.4	50.0	0.0
Poor	2.4	10.0	3.7	25.0	0.0
No Answer/ Don't Know	0.0	0.0	0.0	0.0	0.0

CONCLUSIONS

The detailed analysis of the results isn't yet concludes, is possible to identify some aspects on which it is recommended to work.

About writing and definition of the domains:

- The core question on **Cognitive (concentration and memory)** turns out to be very general, according to this inform, the people do not manage to identify in which context are used; additionally the writing is recommended to modify and to give a greater context and it will be easier to understand by the informant in a Census.
- In **Communication** the question is too long and confuse for some informants (both versions, Spanish and English) although it was included examples for locate in the context of the same one.

On the operative aspects:

- Some type of filter is required in order to apply the questions that determine which questions (social - demographic and core question), define those core questions that can present biases for the age of the respondents, according to the age of the respondents or to carry out the necessary modifications