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A qualitative-quantitative analysis of the clarity of insurance contracts: check of the progress

February 2025

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Foreword

The qualitative-quantitative research into the clarity of insurance contracts commissioned by Ivass in 2022 to LPC *Research*, measured for the first time the degree of readability of insurance contracts through the use of algorithms, quantitative indicators of readability of texts based on objective parameters, and was complemented by a qualitative analysis.

The sample was made up of 30 accident contracts (either stand-alone or hybrid contracts) from 30 insurance companies, accounting on the whole for about 80% in terms of premium income for this line of business.[1]

The results were published in June 2023[2] and were discussed at a *Workshop* with academia, the market and consumer associations.

Ivass shared the results with the insurance companies in the sample, pointing out areas for improvement in the contract examined, and invited them to communicate any initiatives they intended to take to improve the clarity and transparency of their contract texts and, gradually, of the other contracts in their portfolios.

The companies appreciated the research and worked to revise the products by accepting the suggestions made. Some companies relied on external consultants for the audit, others set up in-house teams; meetings were also organised with some companies for an open discussion on the initiatives undertaken.

In 2024 the analysis was followed by a follow-up phase, which is the subject of this report, with the same companies in the sample and on the same accident product, to monitor progress in the drafting of the contracts revised in the meantime.

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1 Two companies included in the sample distributed accident policies that were limited to the reimbursement of medical expenses in case of accident and therefore not fully comparable with the rest of the sample

2 https://www.ivass.it/pubblicazioni-e-statistiche/pubblicazioni/att-sem-conv/2023/26-06-semplificazione-contratti/Analisi_quali_quantitativa_chiarezza_contratti_26_6_23.pdf

The follow-up, again by the company LPC Research, used the same methodology and the same indicators, including the Gulpease index, to enable comparison between the two surveys.

The research and subsequent follow-up helped to define a new methodology, also applicable to insurance products other than those analysed, which provides new and concrete support for improving the simplicity and clarity of insurance contracts.

Riccardo Cesari
Ivass Board Member

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February 2025

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Designed and printed by the Printing and Publishing Division of the Bank of Italy

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1. Introduction

1.1 The project - part two

The follow-up of the project stems from the Supervisory Authority's need to identify the progress made by the industry, from the point of view of simplification and comprehensibility of insurance contracts, in order to foster awareness of the rights and obligations arising from the contract, which follow the indications provided with the first survey.

This research is part of the Institute's broader action to protect policyholders, which includes a set of regulations and activities.

The first survey on the level of clarity of contractual texts was carried out on a sample of insurance contracts to verify, through a scientific quali-quantitative approach, the elements of complexity in contract and how they can be overcome.

In light of the results of the first analysis, undertakings have started a process of simplification and revision of contracts according to different profiles: usability, customer orientation, inclusiveness and syntactic-lexical simplification.

The follow-up has the same characteristics in terms of sample and methodology as the first survey, in order to highlight improvements in both the characteristics that can be detected by a qualitative assessment and the aspects that can also be investigated by a quantitative survey.

1.2 The sample and the qualitative-quantitative analysis

The sample in this second analysis is made up of 26 accident contracts (either stand-alone or hybrid contracts) from 26 insurance companies, In the sample, there are contracts with only one main guarantee (accident), others with two (accident and sickness) and others with more than two (accident, sickness and assistance). For one company, the analysis was carried out on a different contract because the one used for the previous analysis is no longer distributed.

To these must be added an additional company for which only product sheets were available and not the complete information set as it is still under review.

Compared to the sample of 30 companies in the first survey, one company is replacing the product under analysis with another and two companies have been merged by incorporation into another.

Quantitative and qualitative analyses were conducted on the selected contracts, maintaining the same scope of the quantitative analysis in order to compare data from the two surveys.

Quantitative analysis

The analysis focused on the wording of some contract clauses, particularly those governing:

- permanent disability and death due to accident
- limits and exclusions
- the clause concerning the declarations provided by policyholders on the circumstances related to the risk to be insured.

In order to make a homogeneous comparison between the 2022 survey and the current one, the data from the previous survey were recalculated on the sample of 26 companies, i.e. the number of companies in 2024.

Qualitative analysis

The qualitative analysis looked at the entire contract in order to assess the elements of structure, customer orientation and graphics.

A language-specific qualitative analysis was also carried out, covering only the contractual clauses examined for the quantitative analysis.

The analysis also looked at the precontractual documents, DIP (Documento informativo precontrattuale – pre-contractual information document) and DIPA (Documento informativo precontrattuale aggiuntivo – Additional Pre-contractual Information Document).[1]

For each contract, a detail sheet was prepared with evidence of the quantitative and qualitative analysis performed.

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1 DIP comes from a European regulation and follows a standard format dictated by the same Regulation; it contains significant information for understanding the contract such as, for example, the limits and duration of the insurance coverage, the contractual obligations of the client and those of the company, the procedure and timing to withdraw from the contract or terminate it. DIPA is set forth in the Code of Private Insurance and in IVASS Regulation No. 41/2018; it contains more detailed information in order to enable the customer to have a deeper understanding of the insurance product and make a more informed choice. This document indicates, for example, additional or optional guarantees, contract exclusions and limitations, how to file complaints, the law applicable to the contract, dispute resolution procedures, and costs to be borne by the policyholder.

1.3 Methodology and indices

The methodology used is the same for both surveys to ensure a comparison of the data obtained. The purpose of the comparison is to indicate:

- any positive or negative deviations
- if quantitative deviations are reflected in equal differences that emerged from the qualitative analysis.

Tools and qualitative indicators

Quantitative analyses of the selected policies have been carried out using the algorithm of a *tool* for analysing and evaluating the readability of texts in Italian; contracts were specifically processed to allow the correct application of the algorithm to the texts.

This analysis made it possible to obtain information on numerous syntactic-lexical characteristics of complex texts in Italian. The information obtained ranges from the simple calculation of the average length of the periods and words making up the speech to the depth of the syntactic tree and the length of the dependency relations of the periods.[2]

More specifically, the following quantitative indicators were derived:

Gulpease Index (G1)

It indicates the degree of readability of a text, on a scale between 0 and 100, where 100 indicates the highest readability and 0 the lowest readability; the index represents the summary of the evaluation of individual parameters that can capture the syntactic and linguistic complexity of a text.[3]

The parameters for evaluating a text according to the Gulpease are as follows:

- index of **less than 80**: text difficult to read for persons with primary school education
- index of **less than 60**: text difficult to read for persons with secondary school education
- index of **less than 40**: text difficult to read for people with higher education.

---

2 F. Dell'Orletta, S. Montemagni, G. Venturi, *READ-IT: assessing readability of Italian texts with a view to text simplification*, in N. Alm (a cura di), *Proceedings of the Second Workshop on Speech and Language Processing for Assistive Technologies, Edinburgh, UK, 30th July 2011 (SLPAT 2011)*, Association for Computational Linguistics, Stroudsburg, PA, USA, 2011, pp. 73-83.

3 See P. Lucisano, M.E. Piemontese, *GULPEASE: una formula per la predizione della difficoltà dei testi in lingua italiana*, "Scuola e città", XXXIX, 3, 1988, pp. 110-124.

Average length of periods (G2)

It indicates the number of words that on average make up the periods.

→ *This data contributes to defining the degree of syntactic complexity. The higher the value, the more difficult it is to understand.*

Average length of words (G3)

It indicates the number of characters (consonants and vowels) that on average make up individual words.

→ *The figure helps to define the degree of cognitive burden given by word length. The higher the value, the more difficult it is to understand.*

Percentage of words not belonging to the basic vocabulary (G4)

It indicates the words that cannot be found in the basic Italian vocabulary, identified by Tullio de Mauro[4] and taken up again in more recent times.[5] It includes 7,000 words of very frequent use in the language of a native Italian speaker.

→ *This data helps to define the 'modernity' of the language used and its usability by citizens. The higher the value, the more difficult it is to understand.*

Average number of propositions per period (G5)

It indicates the amount of propositions that make up a period (both subordinate and main clauses).

→ *This data contributes to defining the degree of syntactic complexity. The higher the figure, the more difficult it is to understand.*

Percentage of main clauses and subordinate clauses (G6)

The data are given in two successive rows and indicate in percentages the amount of subordinate and main clauses that are present on average in periods.

→ *This data contributes to defining the degree of syntactic complexity. The greater the number of subordinate clauses, the greater the difficulty of comprehension On the contrary, the greater the number of main clauses, the lower the syntactic difficulty.*

Syntactic tree depth (average of maximum heights) (G8)

Indicates the maximum distance between a 'leaf' (represented by words in the text without dependencies) and the 'root' of the tree (represented as the number of arcs, i.e. dependency relationships, crossed in the leaf-root path).

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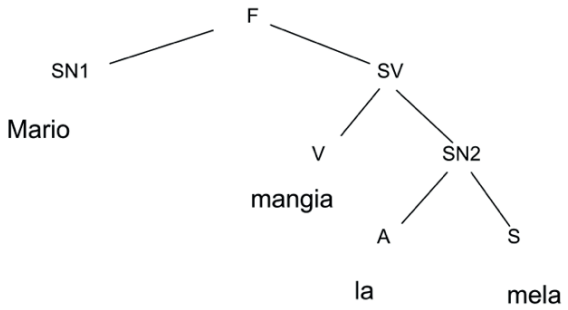
4 T. De Mauro, *Guida all'uso delle parole. Come parlare e scrivere semplice e preciso. Uno stile italiano per capire e farsi capire*, 1ª ed., Roma, Editori Riuniti, 1980, pp. 149-183. This is the third release in the historic series *Libri di base*.

5 *Grande dizionario italiano dell'uso, ideato e diretto da T. De Mauro*, 8 voll., 2ª ed., Utet, Torino, 2007.

→ *The figure indicates the average value of maximum tree heights and thus contributes to defining the degree of syntactic complexity. The higher the figure, the more difficult it is to understand.*

For example:

John eats an apple



F (sentence) is the root

SN1 (nominal syntagma[6]) *John*

SV (verbal syntagma) is made up of V (verb), *eats* and SN2 (nominal syntagma) (*an apple*), which in turn is composed of A (article) *an* and S noun *apple*.

F is the root

SV, SN1, SN2 are branches

John, eats, an, apple are leaves.

The maximum distance is that between *apple* (leaf without dependencies) and the root (F). The distance is calculated in "arcs," that is, how many dependency relationships are crossed. The figure is calculated for all the sentences, from which the average values of these maxima are obtained.

Length of dependency relationships (average) (G9)

It indicates the distance in words between the head and the dependent, i.e. The dependency relations (excluding punctuation links).

→ *The data represents a factor of complexity. The higher the value, the more difficult it is to understand.*[7]

6 A syntagma is a set of words that forms a unit within the sentence.

7 The contiguity of semantically or syntactically 'close' elements makes it easier to understand word relationships.

If we take the previous sentence, the head is *John* and the dependent is *apple*. The length of the dependency relationship is 1. The figure is projected onto the averages of all propositions.

To have a benchmark, the indices were compared with the Italian Constitution, on which there is a study[8] conducted with the quantitative instrument that has also been used for our research. Moreover, as is well known, our fundamental Charter constitutes a universally recognised model of simplicity, clarity and effectiveness, at least in its first part, which was not subject to subsequent amendments.

Operational stages of the analysis

For each of the clauses examined, the analysis of each contract was carried out in separate steps:

1. Quantitative analysis of clauses related to the individual guarantees of each contract
2. Calculation of the above indicators for each company
3. Qualitative analysis of the contract and of the same clauses in light of the results obtained
4. Complete representation of the qualitative/quantitative evaluation of the clauses for each indicator and comparison with the data from the previous survey and the Constitution
5. Aggregation of the quantitative values of individual clauses of all the contracts analysed in order to identify:
    - The weighted average value and the comparison with the parameter of the Constitution
    - The standard deviation, the range and variation coefficient for evaluating the concentration or dispersion of values of each individual contract compared to the average.

The various stages of analysis assessed:

- whether the companies took on board the suggestions made as a result of the previous survey
- the differences with respect to various profiles between the new and previous versions of the contract.

8 D. Brunato, G. Venturi, *Le tecnologie linguistico-computazionali nella misura della leggibilità dei testi giuridici*, "Informatica e diritto", XXIII, 1, 2014, pp. 111-142.

2. Results of the quantitative analysis

Quantitative analysis, as we will see below, offers a range of data that must be carefully considered in itself, but especially in close correlation with qualitative data.

The increased diversity of the companies' interventions (from a degree 0 i.e. almost total invariance to a high index of change), makes the overall quantitative picture very diverse, which may run the risk of offering data that are difficult to interpret.

If, on the other hand, they are correlated with qualitative ones, both in the overall assessment of the sector and in the assessment specific to each company, they offer very useful opportunities for understanding and indicating the path still to be followed.

2.1 General Gulpease Index (of all the clauses examined)

The Gulpease index indicates the summary of an evaluation of individual parameters that measure lexical and syntactic aspects; this index is, therefore, able to capture the complexity of a text on these profiles.

As illustrated above, the parameters for evaluating a text according to the Gulpease index are:

- index of less than 80: text difficult to read for persons with primary school education
- index of less than 60: text difficult to read for persons with secondary school education
- index of less than 40: text difficult to read for people with higher education

- the Constitution, chosen as the benchmark, has a Gulpease index of 54.9.

The quantitative analysis on the sample shows a picture with less significant deviations for the minimum Gulpease index of 40.80 (in 2022 it was 39.54) and for the **average data** with a value of **47.34** compared to 44.24 in 2022. The deviation of the maximum value, which increases from 48.42 to 54.60, is more significant.

It is again noted that the texts considered have a level of difficulty that, on average:

- excludes citizens with primary school education
- compared to the previous survey, some contracts may be understood, with some difficulty, by those with a secondary school diploma

- some contracts put even higher educated citizens at a disadvantage
- however, the trend appears to be positive: 23 contracts considered (out of 26) have a higher Gulpease value than in the previous edition of the report, with an average improvement of about 3 points.

To give further value to said data, it should also be mentioned that in 2023[9]

- the proportion of adults with a lower secondary school diploma as their highest qualification is estimated at 34.8%, with the male component (37.3%) outnumbering the female component (32.3%)
- the percentage of young people aged between 18 and 24 who dropped out of school early is 10.5%. In the South, the incidence reaches 14.6%.

These are just some of the many evidences that indicate a still significant level of exclusion of many citizens from understanding the essential parts of an insurance contract. Complex language creates an unavoidable barrier in addition to aspects such as, for example, cognitive bias. Academic literature has long established that rationality and emotions contribute to influencing decision-making processes involving uncertainty and risk. Numerous studies from the cognitive sciences, neuroscience and behavioural economics have shown that decision-making in financial choices is based on the cost-benefit ratio, but is also influenced by emotions and prejudices (*bias*) and the use of heuristics (shortcuts) that can lead to sub-optimal choices and, at the very least, counterproductive for oneself or the community.

As reiterated in several parts of the report and in the conclusions, it is clear that quantitative analysis alone does not capture all the complexities of a contractual text. The analysis showed that in some sporadic cases the intention to improve the index when rewriting the text may have been more relevant than the simplification of the text and the concepts remained complex.

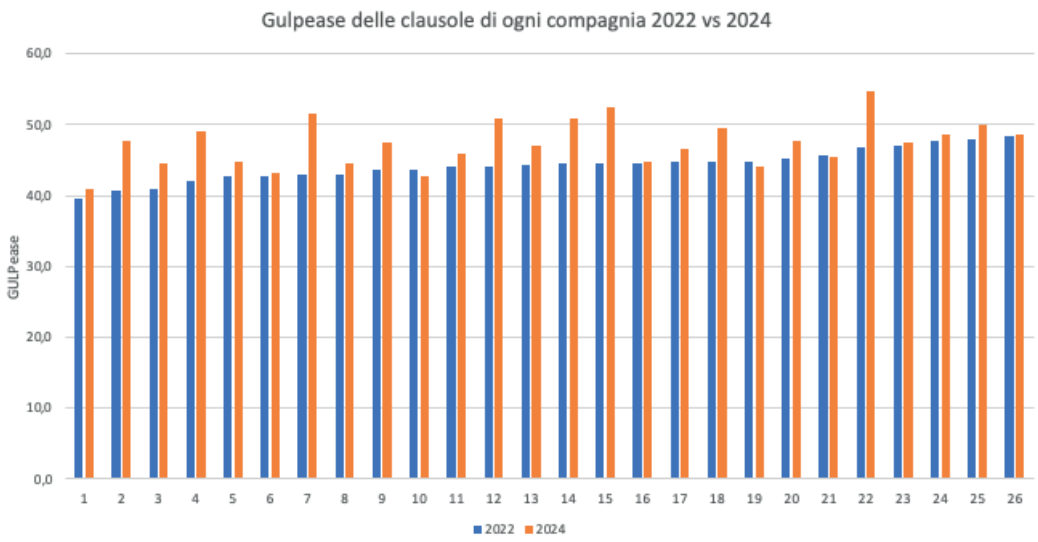
Graph 1 collects the Gulpease index values emerging from the analysis of some contract guarantees of the different Undertakings included in the sample. Here, as well as in subsequent graphs, the contract of each Undertaking is indicated by a number in the abscissa.

The graph clearly shows a very significant data, namely a **substantial increase in the Gulpease value for more than 88% of the sample of Undertakings**, with the exception of 11% of companies which record a slight deterioration. A significant finding is that about **26% of the sample reaches or exceeds the value of 50**, an index never attained in the previous survey.

9 Source: ISTAT Noi Italia, 2024.

Graph No. 1

Gulpease of the clauses of each company 2022 vs 2024



Moreover, in some cases, the deviation between the two surveys is particularly significant with improvements of more than 15 absolute points.

The sector average improves from 44.24 to 47.34 in a modest but significant way.

It should also be noted that the spread between the minimum and maximum values increases: in the previous survey it was about 9 points (minimum 39.5 and maximum 48.40), now it is as much as 14 points (minimum 40.80 and maximum 54.60). The dispersion of the figure from the average data is also indicated by the increase in the standard deviation from 2.2 to 3.3.

Thus, evidence shows a certain gap in the simplification effort carried out by individual Undertakings, both in absolute terms, i.e., over all the values that make up the Gulpease indicator, and in relative terms, i.e. in relation to a specific value.

Based on the overall Gulpease data for each individual Undertaking, 3 groups of Undertakings can be clustered:

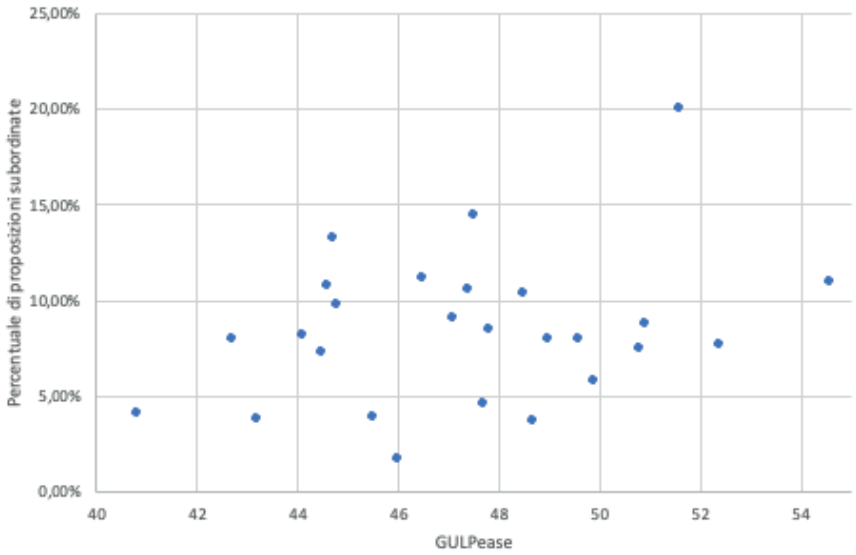
- Gulpease ranging from above 40 to 45: **31%** of the sample
- Gulpease ranging from above 45 to 50: **50%** of the sample
- Gulpease ranging from above 50 to 55: **19%** of the sample

The evaluation of the Gulpease index can be further corroborated by the correlation with other variables, which will be specifically analysed later on, i.e. in the relationship with subordinate clauses and with the general number of propositions per period:

Graph 2 shows the correlation between the Gulpease index and the percentage of subordinate clauses. The correlation is not statistically significant, indicating the absence of a clear relationship between the variables. Graph 3, on the other hand, shows the correlation between Gulpease and number of propositions per period, which, on the contrary, is negative (-0.64) and statistically significant at 1%. These two variables deserve to be analysed in more detail individually.

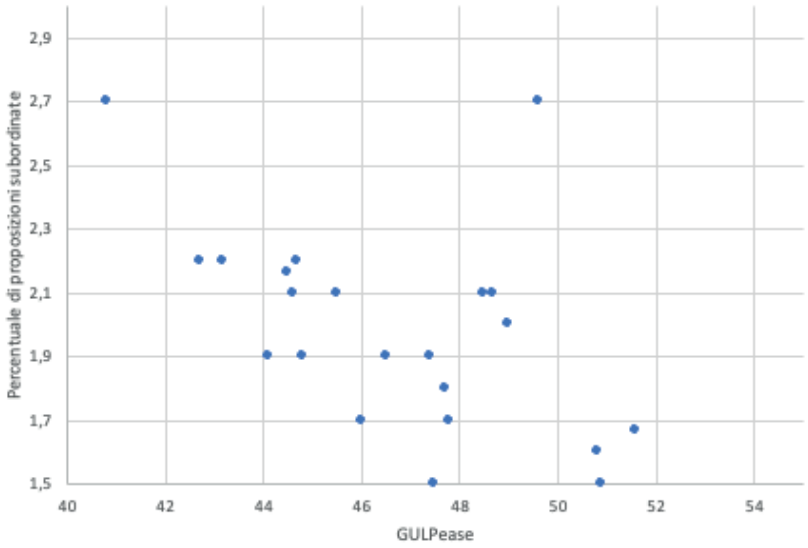
Graph No. 2

Gulpease e proposizioni subordinate



Graph No. 3

Gulpease e proposizioni per periodo



A final consideration must be made in relation to the benchmark of the Constitution: it is true that there is still a difference between the sector average and that of the Fundamental Charter, but the gap has nonetheless become closer. Furthermore, the fact that a company has reached the value of 54.60 is significant of the opportunity and real possibility of reaching at least the value of the Constitution (54.90).

2.2 Gulpease Index of the policyholder/insured person declaration clause on the risk to be insured

The clause concerning inexact or incomplete declarations made by the policyholder is the only article that allows a perfect overlap between the different insurance contracts, as it is present in all the texts.

The most significant general figure concerns the **average Gulpease index**, **which is 44.28**, about 12 points higher than the previous survey (32), just under the general Gulpease index of all the clauses considered, which is 47.34.

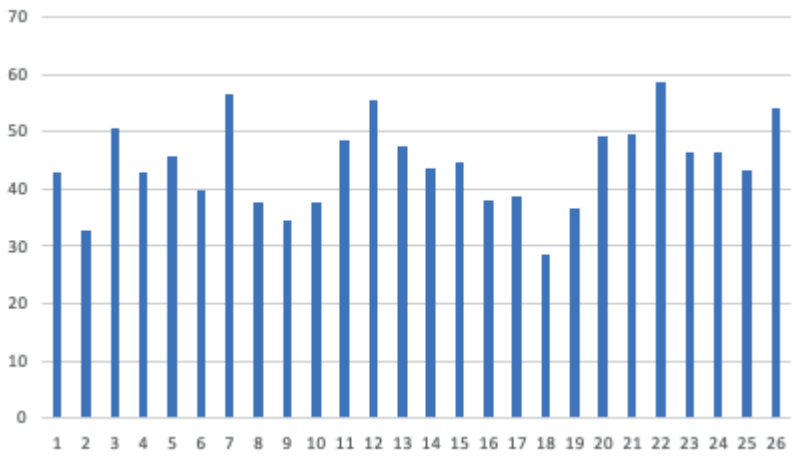
The extremes range from 28.5 to 58.6, therefore with a gap of around 30 points (compared to 17 in 2022); we recall that the maximum gap between the considered values of the overall Gulpease index is almost half, about 14 points.

Graph 4 collects the values of the Gulpease index for the policyholder/insured person declaration clause of the Companies included in the sample.

Graph 4bis shows the deviations for each Company between the 2022 survey and the current survey.

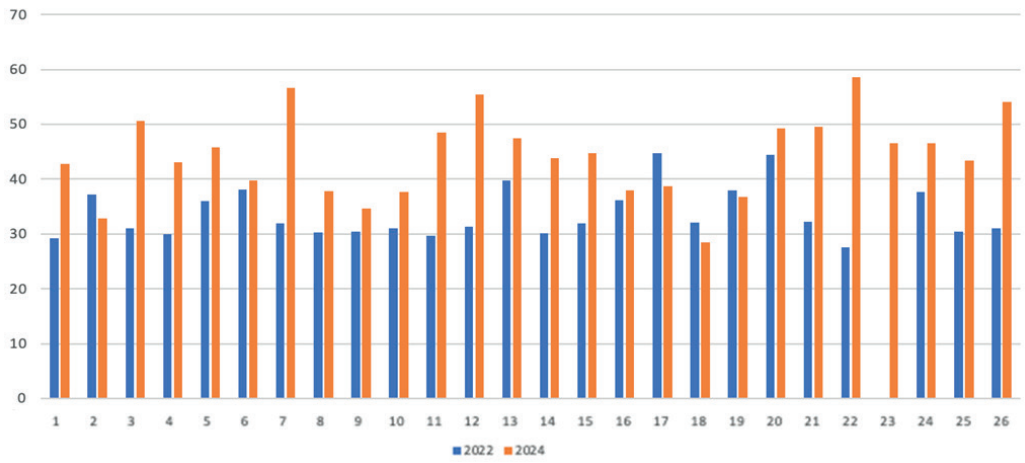
Graph No. 4

Gulpease delle Dichiarazioni



Graph No. 4bis

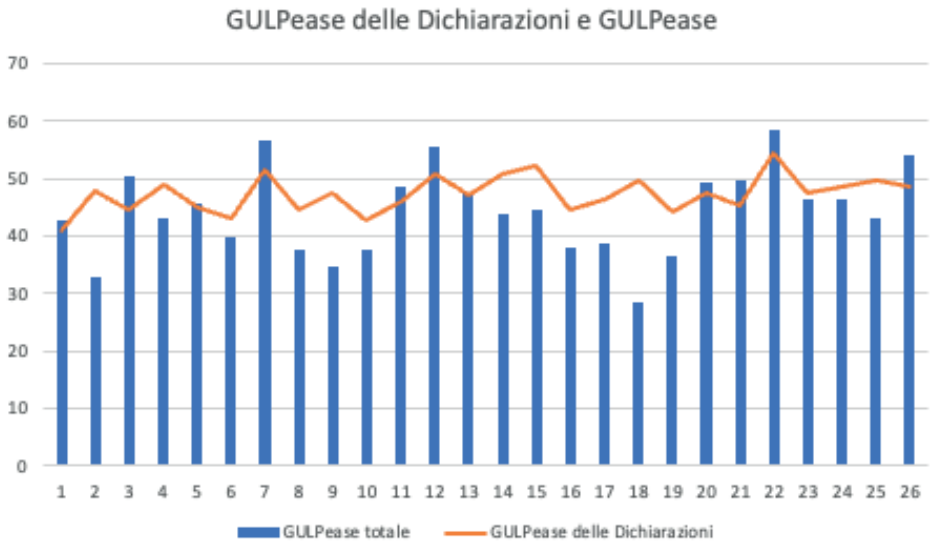
Gulpease delle Dichiarazioni 2022 vs 2024



The correlation between the general index and the clause index is not always clear, as can be seen in Chart 5. It should also be noted, however, that positive peaks in the general index are also confirmed by those in the clause, which does not seem to be the case for negative peaks.

Graph No. 5

Gulpease delle Dichiarazioni e Gulpease



This also confirms that Undertakings have not always carried out a consistent and constant simplification work.

2.3 Specific indicators

As was in part to be expected, the indicators that returned the most significant data concerned five phenomena: **a.** average length of periods (G2); **b.** average number of propositions per period (G5); **c.** percentage of subordinate clauses (and thus conversely of main clauses) (G6); **d.** syntactic tree and dependency relations (G8); **e.** words not belonging to the Basic Vocabulary (G4).

a. average length of periods (G2)

The average figure is 20.72, down from the previous survey, when it was 24.36 words per period. It should be recalled that, according to the so-called Plain Language guidelines adopted or suggested in fact in all countries, the maximum parameter is i 25.[10] This average therefore moves the considered texts away from the upper limit in a significant way.

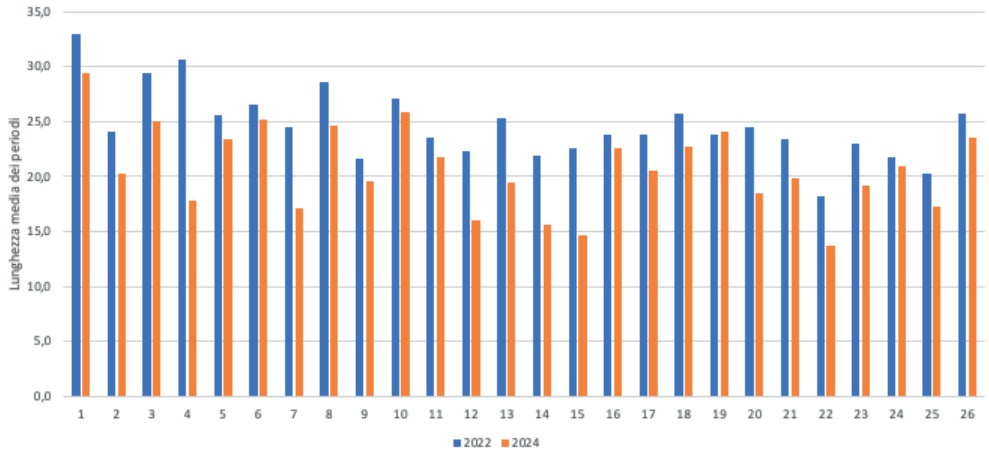
If we look at the extremes, we see that it ranges from a low of 13.70 while it was 18.26, to a high of 29.40, while it was 33.03. The variability between the extremes is therefore very wide, 15.7 points, slightly higher than in the previous survey, when it was 14.77.

The correlation with the overall Gulpease index is important here: the Undertaking that records the best figure (13.70) is the same one that has the highest Gulpease (54.6); on the other hand, the one that has the worst figure here (29.40) is the same one that has the lowest overall Gulpease (40.80).

Graph 6 shows the values for each contract analysed.

Graph No. 6

Lunghezza media periodi 2022 vs 2024



10 L. Carpanè, P. Contaldo, *Te l'assicuro. Più che un metodo per scrivere nelle assicurazioni*, Milano, Centopagine, 2021, pp. 31-35. Please note that the parameter is the same for all the languages.

Undertakings that recorded a marked improvement in the overall Gulpease worked particularly hard on this profile, as shown in the graph.

b. average number of propositions per period (G5)

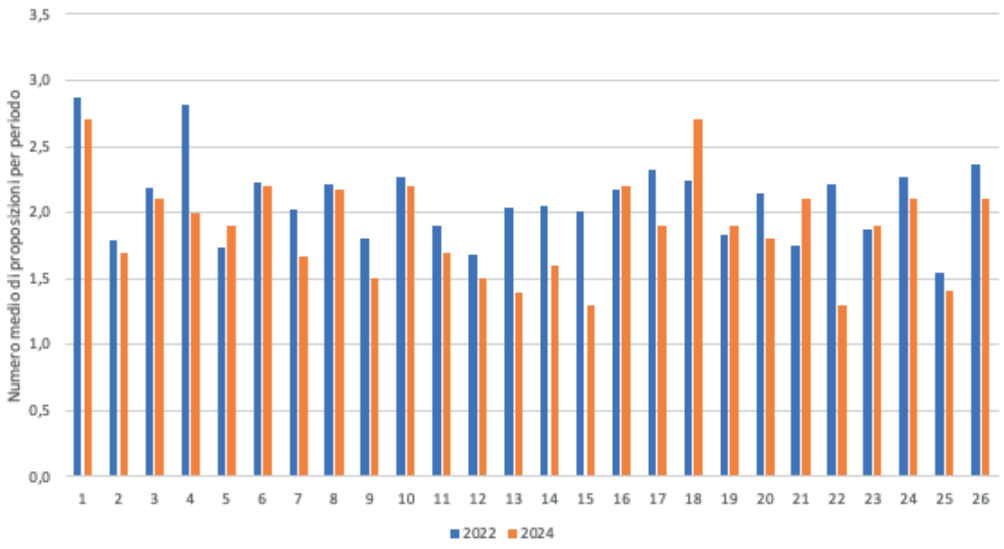
There are no absolute benchmarks in this respect, although the guiding principle is always brevity. Consequently, the communicative result is generally better when the value of the benchmark is smaller. It is to be recalled that the value for the Constitution is 1.372.

This average figure also shows a decrease from the previous survey: from 2.09 to 1.89. The comparison shows very significant levels of improvement for some Undertakings in a very differentiated range. This parameter shows a higher dispersion than the others, with the mean square deviation being 0.38.

Graph 7 shows the values for each contract.

Graph No. 7

Numero medio di proposizioni per periodo 2022 vs 2024



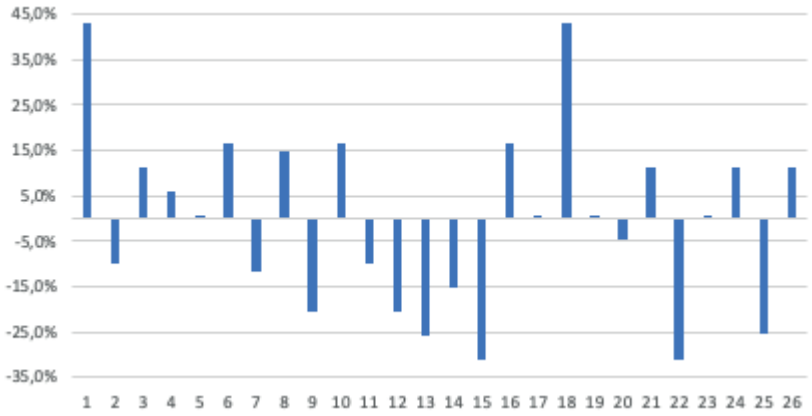
Also in this case, we find considerable variations: we range from a low of 1.30 (it was 1.548) to a high of 2.70: the contract that does best in this dimension has a value less than half that of the one that ranks worst. The reduction is evident for Company 4, which, in order to improve the overall Gulpease, worked with particular attention to the revision of propositions. Number 18, which shows an increase in Graph 7, worked on aspects such as the length of periods to positively impact the total Gulpease (see Graph 6).

About half of the texts considered have fluctuations between +15% and -15% from the average.

The general deviations can be read in Graph 8.

Graph No. 8

Numero medio di proposizioni per periodo (deviazioni dalla media in percentuale)



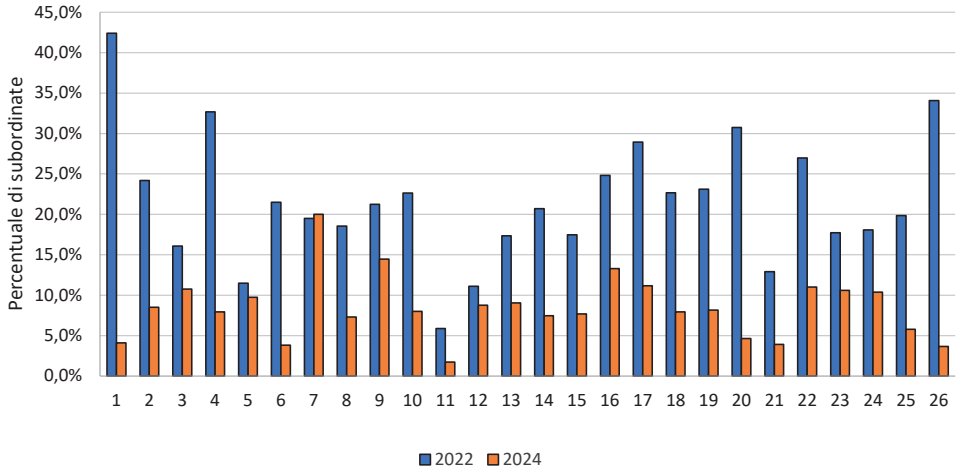
c. Percentage of subordinates (G6)

Data contributes to defining the degree of syntactic complexity of the texts; the greater the number of subordinate clauses, the greater the difficulty of comprehension.

No benchmark can be given on this element either, as it is subject to several variables. The average figure is now 8.46%, much lower than the previous 21.54%. Graph 9 shows the values for each contract examined.

Graph No. 9

Percentuale di subordinate 2022 vs 2024

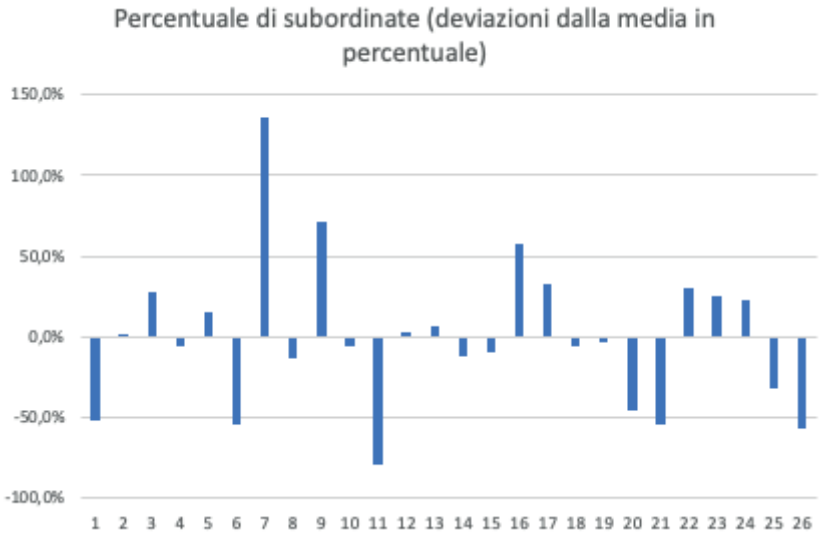


It is significant that it is precisely on this syntactic aspect that the greatest differences are to be found: a range from a maximum of 20% (it was 42.41%) to a minimum of 1.74%, a figure that is, however, affected by the peculiarity of the structure of the specific policy. If we exclude the latter, the lowest figure is 3.66%, which is an extremely low value. The differential between the extremes is very high (see graph 10).

However, for this value too, we note a significant decrease in data from the previous survey. As repeatedly pointed out, we also have confirmation here that it is precisely on the syntactic aspect that the greatest differences and criticalities are to be found.

Graph No. 10

Percentuale di subordinate (deviazioni dalla media in percentuale)



The decrease in this indicator is accompanied by a decrease in the variability of the data, with the mean square deviation going from 8.7% in 2023 to 3.9% in 2024.

d. Syntactic tree and dependency relations (G8 and G9)

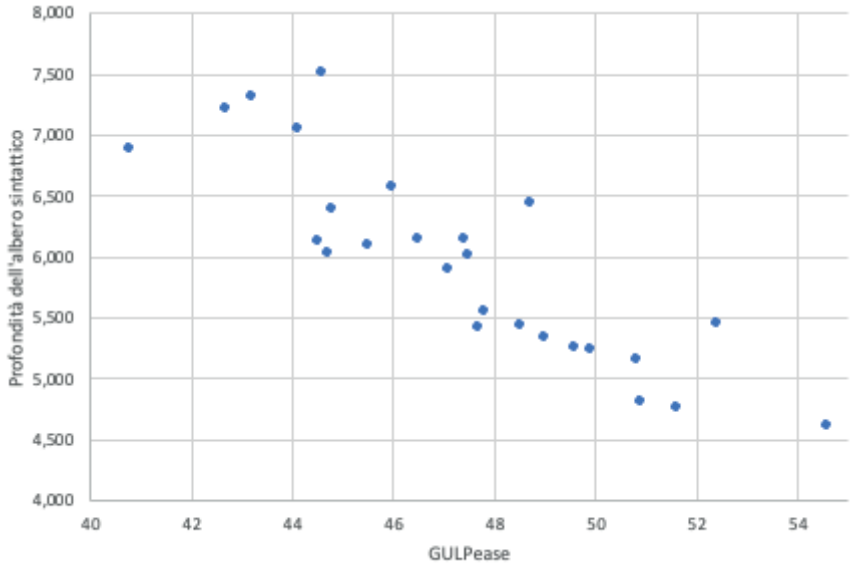
These two indicators help us to understand the degree of complexity in the organisation of the text (see para. 1.3). For both results, there are rather small margins of fluctuation, which is evidence of a roughly similar trend. Before analysing them, it is interesting to observe the correlations with the overall Gulpease index in graphs 11 and 12.

In graphs 11 and 12, we have sorted the Gulpease values by increasing value of the index.

From Figure 11, the direct correlation between the General Index and the length of dependency relationships is clear: an increase in the former generally

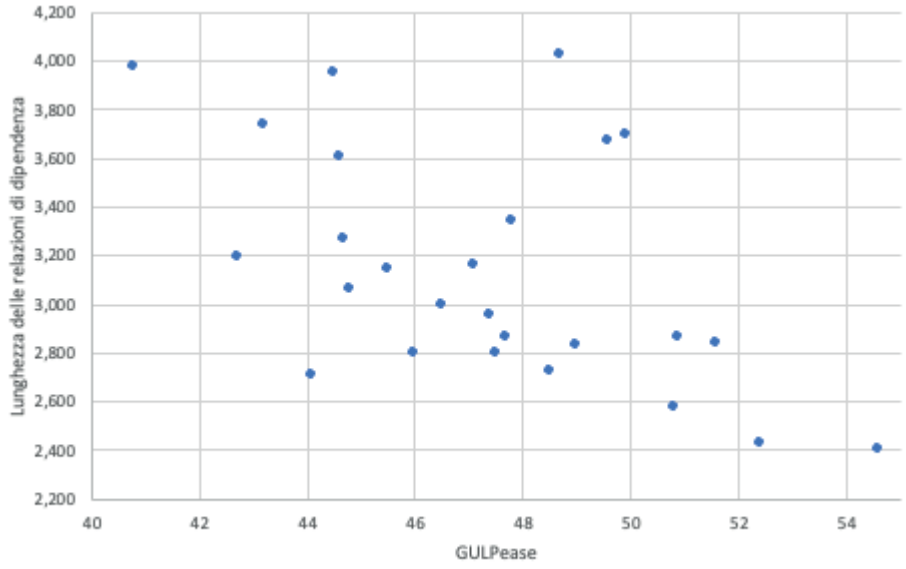
Graph No. 11

Gulpease e profondità dell'albero sintattico



Graph No. 12

Gulpease e lunghezza delle relazioni di dipendenza



corresponds to a decrease in the latter. The correlation index is -0.87, significant at 1%.

From Graph 12, the correlation is less strong (-0.52, significant at 1%): note, for example, the three cases of Gulpease between 48 and 50 and lengths greater

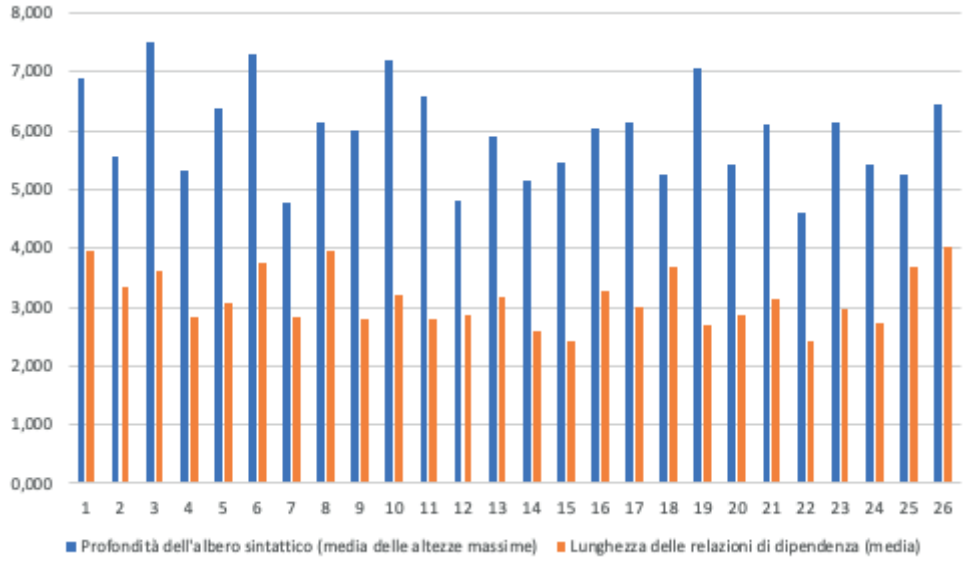
than 3.600. These are in remarkable counter-trend: this means that the syntactic complexities in some cases are mitigated by other positive parameters, i.e. that the simplification work has involved lexical elements, for example.

Moreover, on the subject of syntactic complexity, these indices need to be complemented by a qualitative assessment that gives a measure of which propositions and logical articulations are employed.

We have reproduced the two indicators G8 and G9 in the same graph 13.

Graph No. 13

Confronto: profondità albero sintattico e lunghezza delle relazioni di dipendenza



The data show that the two indicators are not always consistently correlated, although there is some homogeneity on average.

e. Words not belonging to the basic vocabulary (G4)

This data helps to define the 'non-modernity' or complexity of the language used and its usability by citizens. As the value of the parameter increases, the text becomes more difficult to understand (see para. 1.3).

The sector average is 33.97%, down slightly from the previous 36.51%. This parameter shows modest dispersion around the average, as also shown in Graph 14, and the difference from the dispersion in the previous report is minimal.

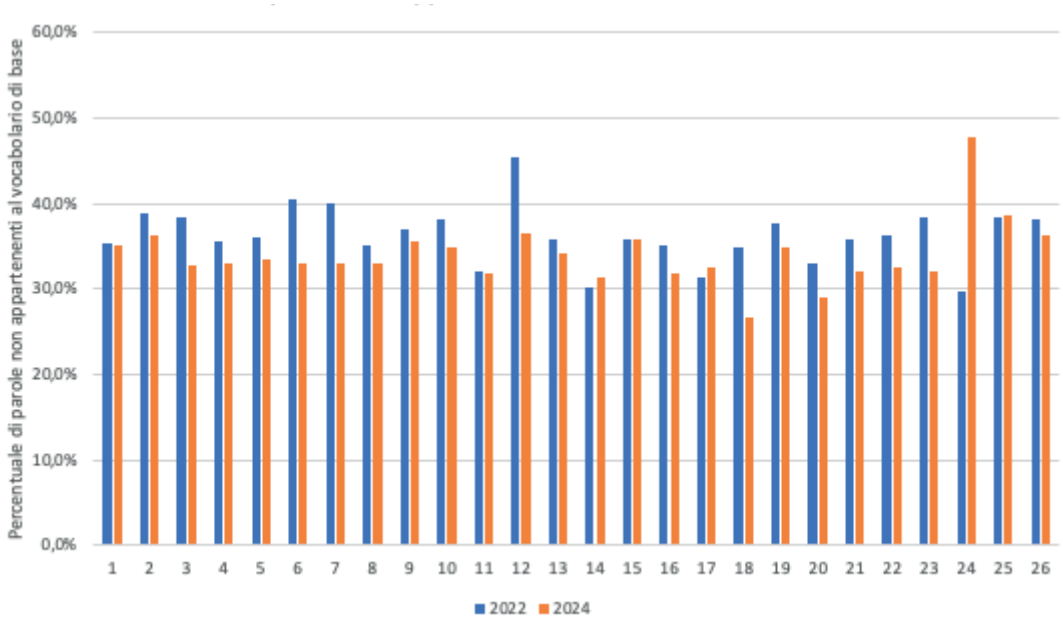
This quantitative data should be complemented by what is reported below in the qualitative analysis. However, it can be stated here that for the characteristics of insurance contracts, simplification is achieved by significant intervention in the

syntactic part rather than in the language, which is constrained by technicalities peculiar (and necessary) to the sector.

The partial figures for each Undertaking also mark a steady decrease, with a low of 26.60% and a high of 47.80%. If we exclude the latter figure (which, however, may have a reason), the maximum is 38.70%.

Graph No.14

Parole non appartenenti al vocabolario di base 2022 vs 2024



2.4 Overall evaluation of quantitative data

In table 1 below, we summarise the overall data comparing the industry average with the Constitution. For each indicator, the standard deviation, range and coefficient of variation were also calculated.[11]

Tabella 1

	Indicators	Average* of the sector 2022	Average* of the sector 2024	Difference 2024-2022	Benchmark: Italian Constitution	Standard deviation	Range	Variation Coefficient
G1	**GULPease**	44.24	47.34	3.10	54.90	3.26	13.80	0.0689
G2	**Average length of periods (words)**	24.64	20.72	-3.93	15.6**	3.84	15.70	0.1854
G3	**Average length of words (characters)**	5.67	5.58	-0.09	5.50	0.16	0.70	0.0282
G4	**Words not belonging to the basic vocabulary**	36.27	33.97	-2.30	41.19	3.75	21.20	0.1104
G5	**Average number of propositions per period**	2.09	1.89	-0.20	1.37	0.38	1.40	0.1999
G6	**Percentage of subordinate clauses**	21.64	8.46	-13.18	13.90	3.88	18.26	0.4590
G7	**Main clauses (average per period in %)**	78.30	91.50	13.20	86.10	3.90	18.26	0.0426
G8	**Syntactic tree depth (average of maximum heights)**	7.01	5.96	-1.05	7.12	0.81	2.91	0.1360
G9	**Length of dependency relationships (average)**	2.77	3.14	0.37	2.54	0.48	1.62	0.1525

*Weighted average.
**The value is calculated in tokens. If it were calculated in words it would return a slightly lower figure, so the comparison would be worse for the sector.

In summary, given all the available data, we can come to these conclusions:

- the relevant element is syntax, i.e. the organisation of the period: the parameters defining the syntactic theme – number of words per (period

11 The coefficient of variation represents the dispersion around the mean and is independent of the unit of measurement. It allows the variability of different indicators to be compared.

G2), number of propositions per period (G5) and percentage of subordinate sentences (G6) – contribute in a decisive manner to the overall improvement of contract texts

- these three data can also be partly associated with the depth of the syntactic tree (G8) and the length of the dependency relations (G9). The variations from one Undertaking to another have generally small values due to the very nature of the data. These data also confirm a general decrease in complexity
- another critical element is the lexicon: the quantitative data, as mentioned above (G4), reveals a relevant aspect, that is, a considerable presence of unfamiliar words; however it is the lexical aspect that needs a qualitative analysis more than other aspects, as we will see below in paragraph 3.3
- the mean of lexical indicators, particularly average word length (G3), indicates that all contracts continue to have a complexity due in particular to the word length. However, this figure must also be evaluated qualitatively, otherwise it runs the risk of being misleading.

As we have seen, the Gulpease index is a good synthetic evaluation tool; however, it must be integrated with the other elements to obtain a general scenario, which touches the constituent elements of the textual system.

To be transformed from an analysis tool to a direction indicator, these quantitative data also need qualitative data, outlined briefly here, which must however be read on a case-by-case basis.

Attached to this report, as additional analytical evidence, is the "*Appendix: Multivariate Analysis of Quantitative Indicators.*"

3. Results of the qualitative analysis

3.1 Structure, graphics and customer orientation

3.1.1 Structure

The analysis of the structure of contracts has taken into account the different features of the types of policies that have been the subject of the survey.

Compared to the previous survey, it can be seen that the articulation of guarantees remains more or less extensive and the presence of guarantees that are always operative and others that are only operative depending on the purchase of the main guarantee. The interventions carried out on the structure are differentiated:

- total revision also involving common standards with a view to greater customer orientation, usability and simultaneous syntactic/lexical revision
- change of structure maintaining the traditional difference between common rules and guarantees but with an articulation of guarantees that recalls pre-contractual documentation, with more or less incisive interventions on the language
- some minor adjustments to respond to the suggestions of the previous survey, from which there does not seem to be a willingness to rethink the logic of product presentation.

It is reiterated that no best practice can be identified that would give the same structure to all types of contracts, but with respect to the interventions, some significant examples can be inferred.

a) The structure of the individual guarantee:

Compared to the previous survey, it is evident that a lot of work has been done on the structure of the guarantee:

- few companies now maintain the structure previously adopted, even if this intervention is not a driver for further simplification
- almost all companies have intervened on the structure of the guarantees. The headings of the pre-contractual documentation make it possible to divide the contents of the guarantee according to different aspects: "what is insured", "how is it insured","who and what is not insured".
  For contracts with more than one guarantee, forms or sections are proposed that distinguish the different guarantees, e.g. Section 1 Accident, Section 2 Sickness, in each section you will find the headings

- less frequent is the work of rewriting the guarantee in a customer-oriented manner, i.e. enhancing the content of the guarantee, declining it with logical and thematic processes and revising it with a view to syntactic/lexical simplification.

The evaluation shows that the suggestions made to companies on the basis of the first survey produced:

- a widespread revision of the contract structure according to a logic of sections/modules and headings
- a reallocation of the contents of guarantees that has led to a widespread improvement in the comprehensibility of the perimeter of the guarantee because specific limits, deductibles and exclusions can be found under the heading 'what and how is insured'
- the persistence of valid exclusions on several guarantees presented according to bulleted lists, with an often more immediate formulation. It should be noted that the reference to these exclusions in the individual guarantees is not always adequate. One still finds some, rare, formulation such as 'without prejudice to the exclusions laid down in Art.'
- less frequently the invitation was accepted to propose the benefit of coverage first and subsequently the other elements. There are different ways of approaching the review: in some cases the company highlights the benefit from the outset but does not systematise the content of the guarantee; in other cases, some guarantees have been rewritten with the initial indication of the benefit, but this is not systematic throughout the contract; in other cases the benefit is indicated but there is no simplification of the language in the description of the entire guarantee
- a general intervention on possible oversights, typos
- an inclusive rewriting of some of the terms used in the previous survey.

In the part dedicated to common standards, only a more limited number of Companies have worked on the structure.

b) The glossary

Having reviewed the glossaries, no particular misalignment with the contents of the contract can be detected. On the other hand, some rarer criticalities remain:

- lack of differentiation between explanation and examples
- syntactic-lexical complexity in definitions or references to other definitions.

Graphics tend to be treated with varying degrees of sophistication.

3.1.2 Graphics

There are more interventions on this element, which, not always, improve readability but support usability.

There are still cases where a modest graphic design (usually bold) has been used for the elements the customer has to pay more attention to (such as limits and deductibles).

In other cases, a graphic restyling has been carried out that takes into account choices that may vary according to tools and objectives. In some contracts, icons taken from the pre-contractual documentation were included and others were created specifically for the contractual conditions.

In addition to icons, other graphic elements, useful for simplifying the text and make it more readable (pop up, boxes, images), are used, but only by a limited number of Companies.

More frequent is the use of graphic choices, such as colours in the table of contents to differentiate, or icons to attract attention. In some cases, the size of the icons should be reconsidered. Remember that in black and white printing certain choices are lost.

In order to avoid walls, i.e. compactly written texts for long parts of the contract, solutions such as division into sentences and bulleted lists were adopted. On this second aspect:

- graphical oversights such as typos and list numbering have been resolved
- critical issues still remain, especially where language has not been addressed;
  - guarantees are explained in bullet points, but explanations remain cumbersome;
  - the lists have a repeated element at the beginning of each point which makes reading burdensome.

There was also a reversal of the trend: almost all the sample took up the suggestion to indicate the graphic choice of words in the glossary, or the elements to which the customer should pay attention.

3.1.3 Customer orientation

a) Some of the issues highlighted in the previous analysis with regard to inclusion and linguistic complexity remain:

   - contract names with foreign words or adjectives (such as *total*) that may imply a higher level of coverage than actual coverage;

- names of individual guarantees or insurance plans that contain adjectives (such as *comprehensive*) leading to the consideration set out in the previous point;
- names of guarantees that do not emphasise the value of the guarantee but the adverse event, particularly death: well known and consolidated studies indicate insurance customers' instinctive aversion to topics related to death or serious health events;
- the gender discriminating terms have been overcome, there are still some inaccuracies, the most relevant of which refers to different abilities (*handicapped people*[12]);
- English titles for the guarantees, which may not be appreciated by some customer segments;
- the different names for certain documents, in particular the policy sheet, policy card or policy, are no longer used.

b) Restricted area: it is welcome that the suggestion to emphasise this instrument has been taken up by many Undertakings. Some describe the role of the restricted area on the presentation page, even with very specific descriptions, others include a specific article with indications of how to access and use it.

c) Conditions applicable to all guarantees: further action is required. In many cases, the simplification concerned only the article on the policyholder/insured's statements on the risk to be insured and not the other obligations for the customer.

d) Presentation page: companies accepted the invitation to introduce or implement it with the inclusion of: operation of the contract, indication of graphic choices, support tools and operation of the restricted area.

e) Contacts: some companies have clearly explained the contact methods between the company/intermediary and the customer, on the home page or in specific boxes.

In conclusion, the assessment of customer orientation that emerges from the analysis of the contracts is quite positive and highlights that many suggestions have been accepted, some implemented better than others also thanks to graphic support. The issue of rationalising all the contents of the contract from a cognitive perspective, also taking into account the relevant biases, remains open.

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12 The *International Classification of Functioning*, approved by the World Health Assembly in 2001, in which a deficit-based terminology (*handicap, disabled, dyslexic*, etc.), or one that equates the person with the disability (hence the criticism of *differently abled* as well), is abandoned altogether, and instead more descriptive terms of life contexts are adopted, which focus, in a multidimensional perspective, on a person's resources and abilities rather than on his or her failures.

As already indicated, the graphics were the element on which many interventions were made, both minimal such as the removal of inaccuracies and typos, and substantial such as the insertion of supporting elements, the search for colours, and the insertion of tables, all of which were functional for greater usability and comprehension.

3.2 Syntax and grammar

In addition to the aspects found with the quantitative analysis, additional positive elements are:

- a widespread, though uneven, replacement of formulas with the subjunctive, such as "*should the policyholder wish*" with the indicative (if the *policyholder wishes*), an innovation suggested in previous research;
- the decrease, but not the disappearance, of implicit formulas with the participle and, albeit in a smaller percentage, also with the gerund, as already recommended in 2011 for administrative acts[13]
- as far as verb tenses are concerned, the substitution of the future tense for the present tense.

Areas for improvement remain, however:

- some instances of excessive length of periods (over 80 words);
- often, reduced sentence lengths owe their brevity to the simplicity of the concepts they express;
- the still frequent use of long adverbs, especially those ending in -ly: their length generally advises against their use, especially when they can be replaced by shorter ones. Often, the use of these adverbs is only an attempt to refer to a style that is considered more sophisticated, sometimes wrongly, (e.g: prior to instead of before; subsequently instead of after; solely instead of only, etc...).

Syntactic organisation, which we have already examined before (para. 2.3, points a-d), deserves separate discussion.

Indeed, a close correlation emerges between those quantitative data and a syntactic analysis, aimed at reconstructing the logical flow (which propositions are met and with which conjunctions).

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13 Working group sponsored by the Institute of Legal Information Theory and Techniques and the Accademia della Crusca (by), *Guida alla redazione degli atti amministrativi. Regole e suggerimenti,* Firenze, ITTIG-CNR, 2011, p. 22. On this and similar issues, see also L. Carpanè, V. Morlacchi, *Che contratti! Progettare, scrivere e disegnare contratti chiari e semplici,* Torino, Giappichelli, 2022.

What we have observed is that , in correspondence with longer structuring, there is also a sequence of subordinate and coordinate clauses the interpretation of which becomes more difficult, not least because of lexical choices (for example conjunctions) and morphological choices (verb modes and tenses).

3.3 Lexicon

Reading and analysing the vocabulary used in contracts confirms the perception of a still relatively bureaucratic language. On this aspect, there are still areas for improvement where action can easily be taken to make contracts clearer. Here are some examples:

- use, although much less common, to the generic 'Company' to indicate the name of the company, with a case like this one: *The Company may also communicate the data to companies or individuals external to the Data Controller's organization*. Wording now present in few contracts
- recourse to formulas exclusive to legal-bureaucratic language: *subject to the right; without prejudice to the provisions*; *with exclusive reference to the provisions, etc.*. These are expressions that have already been defined as '*spurious*' or '*collateral technicalities*' by Mortara Garavelli;[14] significant reduction of these formulas that nevertheless remain especially as regards exclusions
- use of redundancies, traceable to the rhetorical figure of *amplificatio*: *the Policyholder shall in any case be entitled to; with no professional character*; in this case too, there is a fair amount of revision of these forms
- use of nominalisations: *without the application of; with the exclusion of; from termination of;*
- use of verbalizations, that is, use of verbs in nominal function, such as: *within twelve months of the date of occurrence of the accident*
- use of unnecessary or ambiguous conjunctions, such as *and/or*
- use of words that do not correspond to the reality (not only the one perceived) of the insurance contract: *premium agreed*; *it is expressly understood that*
- the use of variatio sinonimica: in some cases, to indicate the occurrence of accidents various verbal expressions are used (*due to, caused by, determined by, as a result of*), with the effect of creating doubts in the reader as to any differences. In some cases, the text even goes so far as to juxtapose words with similar meanings (*arising out and resulting from*)

14 B. Mortara Garavelli, *Le parole e la giustizia. Divagazioni grammaticali e retoriche su testi giuridici italiani*, Torino, Einaudi, 2001.

- the use of a negative language: expressions such as *therefore for a duration of no less than* have the power to generate unnecessary logical contortions.
- use of words of rare and ambiguous usage, in a form no longer commonly used.

3.4 Policyholder/insured person declaration clause on the risk to be insured

As we have seen above (para. 2.2), this clause offers data that presents a different and often uneven scenario from the overall data.

Turning to a qualitative assessment four different types of intervention can be found:

- passages taken word by word from the text of the code (it is now the least frequent case, the opposite of what was found in the previous survey)
- broader indication, now using more sentences that do not produce a simpler text (it is used by some companies)
- summary indication but with elements that clarify the content of the text, e.g. box (used by some companies)
- rewriting for greater comprehensibility (it is now the most frequent case).

In some cases the rewriting, carried out in order to make the contents more explicit, may have had the unintended consequence of making them more cumbersome, especially if, as has occurred in some cases, elements have been added which are not proper to the 'Declarations' but which concern other aspects of the contract aimed, however, at making the policyholder fully understand the scope of the clause implying an obligation.

It should be noted that in those cases where the revision focused only on the suggestions made following the first survey, the clauses involving obligations for the policyholder, such as increased or reduced risk or the presence of other covers, were not rewritten.

3.5 Overall evaluation of qualitative data

The analysis of qualitative data with regard to language offers a threefold partition of the results:

- a **first group**, comprising **23% of the sample**, in which the interventions were significant and in some cases **much improved** on the previous version;

- a **second group, 54% of the sample**, in which there are **positive interventions** but which do not have a particular impact and above all are not always consistent throughout the text;
- a **third group, 23%** of the sample, in which there is substantial **negative continuity** with the previous text. The critical points that had emerged can still be seen; in three cases the contract is more or less the same, with no major changes.

In conclusion, the analysis shows that formal stylistic features and forms of the "insurese" language are still widespread.

However, there is no doubt that in an increasing number of cases, clear signs of the direction taken towards clearer and more comprehensible texts can be discerned.

Qualitative analysis provides data that can be aligned with quantitative evaluation. We recall that, based on the overall Gulpease data for each individual Undertaking, 3 groups of Undertakings can be clustered:

- Gulpease ranging from above 40 to 45: **31%** of the sample
- Gulpease ranging from above 45 to 50: **50%** of the sample
- Gulpease ranging from above 50 to 55: **19%** of the sample

These values are consistent and aligned with the above, and show how the quantitative analysis reports a trend and it is then the qualitative analysis that can best reflect the actual work of simplification.

4. Evaluation of interventions on some specific clauses

The examination was focused on the interventions on clauses relating to:

1. guarantees for permanent disability due to accident and death due to accident;
2. exclusions from the guarantees listed in point 1;
3. limits to the guarantees listed in point 1;
4. inexact or incomplete declarations.

4.1 Clauses relating to guarantees for permanent disability and death and to exclusions

Here, we have made a synthetic assessment of how much of the suggestions provided in the previous analysis have been accepted.

4.1.1 The presentation of guarantees

For those companies that have completely revised the contract, there is also an activity to change the presentation of the guarantees, not always accompanied by accurate work on the content.

Compared to the previous survey, Undertakings have accepted the following suggestions:

- inclusion of boxes with explanations of some elements regarding the functioning of guarantees (operating mechanisms of certain aspects of the contract), which certainly helped in the understanding how more technically complex guarantees work;
- explanation of technical terms in boxes, where a relevant term of a guarantee (e.g. accident) is defined, as well as in the glossary; the box makes a significant contribution to comprehensibility, even if, in fact, it lengthens the texts. This aspect cannot be captured by a quantitative evaluation and sometimes (evident in the case of one company) lowers the value of the total gulpease;
- emphasis on the positive aspect of the guarantee in the opening of the presentation, which is not always followed by an appropriate rewording of the whole article;

- point-by-point presentation of the characteristics of the guarantees, sometimes with reduced effectiveness, because the use of bureaucratic expressions remains (notwithstanding);
- adoption of solutions that are more in line with a changing context (concept of the non-traditional family, extension of guarantees also to non-cohabiting parents);
- reformulation of the names or texts of certain guarantees to avoid gender inequality: there are still a few issues, such as referring to 'babysitter' as a female figure and a few more serious concerns regarding the term 'handicap'. No reformulation instead with respect to the use of gender language (overextended masculine)
- change of reference to conscription, now replaced by voluntary service
- the issue of beneficiaries and children in the event of the simultaneous death of both parents with minor or severely disabled children has been resolved: the characteristics of the children who are entitled to the increase have been made explicit: legitimate, testamentary heirs or beneficiaries.

4.1.2 Limits and exclusions

As repeatedly stated, the work on simplification must be instrumental in unambiguously indicating the scope of the guarantees. In this regard, it was emphasised in the previous section (4.1.1) how the explication of guarantees has improved thanks to a representation of the contractual text articulated in sections/modules and headings.

This element is instrumental in clarifying the scope of the guarantee but with the limitation of exclusions that apply to all guarantees.

In fact, for each section/module, e.g. in the accident module, under the heading 'what is not insured' the specific exclusions are listed, with a reference to the general exclusions. In the case of contracts with a limited number of modules, consulting the section and at the same time the general guarantees is not complex, whereas in the case of highly structured contracts the risk is that the customer, given the bulk of the documentation, cannot easily understand the actual scope of the guarantee.

The graphics and the indication of how the contract is constructed on the presentation page are also very useful in this regard.

Another element is the list of exclusions in bold type, which loses its effectiveness as lists are generally long. Although this remains the most popular choice, there are also other solutions such as a coloured frame, which is attractive and effective.

Some critical issues remain, especially with regard to exclusions and ancillary guarantees that ensure what is excluded from the basic guarantee. If such a situation allows to cover more target markets, on the other hand, it does not serve clarity. Even in this case, the initial presentation of the possible compositions of guarantees makes the scope more comprehensible.

it is clear that it is not possible to indicate a better method than others, and that in the future technology will provide further elements of sophistication to allow companies to present personalized documents to the customer, thanks to it support tools. consider, for example, a pop-up presenting exclusions.

There are still contracts where the choice made, not very optimal, is to set out the contractual documents in several documents, sometimes graphically and (in the case of paper) physically separate; in this way, it is impossible to be fully aware of the entire contract without having read all the documentation, which is often copious and sometimes marked by titles that can mislead even experts.

Some inaccuracies in the exposition found in the previous analysis have been resolved (i.e. the same event is insured in some articles and excluded in others or the limitation period is one year instead of two).

4.2 Policyholder/insured person declaration clause on the risk to be insured

The clause in question was considered in two respects:

- it is often the source of many of the critical issues found in insurance contracts;
- it represents an obligation for the policyholder, so as a guideline it should be well spelled out, also to emphasise the active role of the policyholder and the insured from the moment the contract is signed.

The intervention on this clause is differentiated:

- position:
  - many companies preferred to keep it within the common rules that remain in the opening of the contract, moving it from its initial position;
  - some have unpacked the common rules and thus the clause has been moved to a section on obligations placed after the presentation of guarantees;
  - other companies have left it at the beginning of the contract, typically companies that have not revised their contracts.

- presentation methods:
  - 77% of companies worked on the revision, of these, 26.9% included *boxes* or tables with examples
  - 23% of companies carried out minimal or no interventions.

5. Conclusions

The follow-up confirms that:

- both quantitative and qualitative analysis are needed to express an overall assessment of the clarity and simplicity of contracts;
- there are many ways of presenting both the structure of the contract and its contents;
- there is an industry focus and commitment, but this has not yet been systematically translated into greater simplicity and clarity of all aspects of the contract;
- more frequently the revisions appeared non-uniform and:
  - adopted in response to suggestions made to companies by Ivass following the first survey;
  - aimed at restyling graphic aspects including some customer support elements;
  - capable of improving only some of the more critical syntactic or linguistic aspects.

The overall analysis shows that gulpease data are improving and this is also confirmed by the qualitative analysis. In any case, it is necessary to continue working on systematising the interventions by making them uniform throughout the contract so that the structure is functional for the progressive presentation of the contents with the use of clear and comprehensible language.

As already stated, this can be achieved if the processes, methods, objectives and content of simplification are conducted in a manner the effectiveness of which is widely recognised, as also suggested in recent publications.[15] Here, emphasis is placed on the importance of acting, taking into account the progression of the cognitive process in acquiring the many complex aspects of a contract. Without wishing to distort its function, the contract can nevertheless be regarded as a vehicle for making the customer aware of the obligations and improving awareness of the content of individual guarantees.

The attention of companies is once again drawn to the need to carefully evaluate the content of guarantees also in terms of updating, regulatory compliance and the value of the individual guarantee. Some guarantees, which are the result of continuous revisions of the contract, have an excessively limited scope and therefore need to be reconsidered with a view to improving the quality of insurance contracts and better responding to the evolution of the social context, especially with regard to the evolution of the socio-economic reference framework.

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15 L. Carpanè, P. Contaldo, *Te l'assicuro. Più che un metodo per scrivere nelle assicurazioni,* Milano, Centopagine, 2021.

In this regard, it is noted that the insurance industry is working on a gradual and proportional revision of contracts, tailored to the characteristics of each individual Undertaking, in order to improve their simplicity and clarity.

Below is the *Statistical Appendix: Multivariate Analysis of Quantitative Indicators* referred to in para. 2.4.

Appendix – Multivariate Analysis of Quantitative Indicators

Below we examine the indicators presented in the Report (Tab. A1), excluding the seventh, which is a simple transformation of the sixth: G7=100%-G6.

Since the sample size was further reduced compared to the previous sample, it was decided to use a significance level of 5%, compared to 10% in the previous survey.

Tab. A1 List of quantitative indicators

GULPease G1
Lunghezza media periodi (n.parole) G2
Lunghezza media delle parole (n.caratteri) G3
Parole non appartenenti al vocabolario di base % G4
Numero medio proposizioni per periodo (princ e sub) G5
Percentuale di subordinate % G6
Proposizioni principali (media per periodo in %) G7
Profondità dell'albero sintattico (media delle altezze massime) G8
Lunghezza delle relazioni di dipendenza (media) G9

A1. Univariate and bivariate statistics

Several correlations exceed 50%. In detail, the GULPease index (G1) has a strong negative correlation with the average length of periods (G2, 90.0%) and the depth of the syntactic tree (G8, -86.8%). It also correlates strongly with the average number of propositions per period (G5, -64.3%).

Other correlations include mechanically high correlations between average length of periods (G2) and the depth of the syntactic tree (G8, 83.6%) and average length of periods and length of dependency relations (G9, 69.6%).

Figures A1-A8 illustrate the Pearson and Spearman correlations (calculated on ranks) among the variables analysed in this report.

Univariate statistics can be found in Tab. A2, while correlations are shown in Tab. A3.

TAB. A2 Univariate statistics

Variable	Number of observations	Average	Std. Dev.	Median	Minimum	Maximum
G1	26	47.34	3.26	47.45	40.80	54.60
G2	26	20.72	3.84	20.40	13.70	29.40
G3	26	5.58	0.16	5.60	5.10	5.80
G4	26	0.34	0.04	0.33	0.27	0.48
G5	26	1.89	0.38	1.90	1.30	2.70
G6	26	0.08	0.04	0.08	0.02	0.20
G7	26	0.92	0.04	0.92	0.80	0.98
G8	26	5.96	0.81	6.02	4.61	7.52
G9	26	3.14	0.48	3.03	2.41	4.03

TAB. A3 Correlation matrix

	G2	G3	G4	G5	G6	G8	G9
G1	-0.8998942	-0.3510136	0.06188877	-0.6428965	0.29854107	-0.8682666	-0.5210111
G2		-0.0008137	-0.0234112	0.80163137	-0.2785521	0.83649218	0.69560155
G3			0.05262223	-0.2826763	-0.133243	0.26044023	-0.1535793
G4				-0.1823053	0.0643296	-0.0489569	-0.0721413
G5					-0.2347052	0.49349978	0.62645022
G6						-0.326899	-0.344984
G8							0.44844879

Fig. A1

Fig. A2

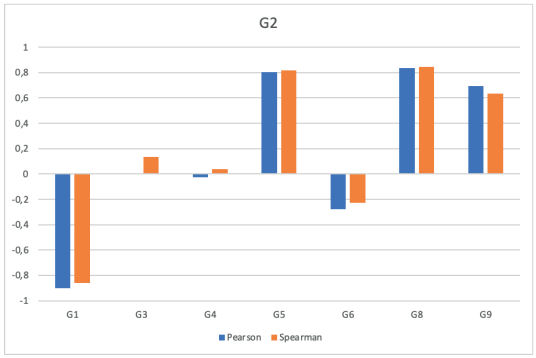


Fig. A3

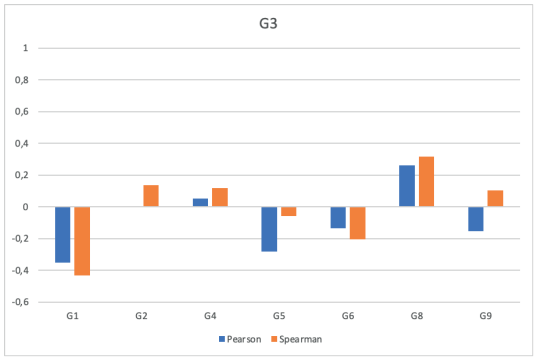


Fig. A4

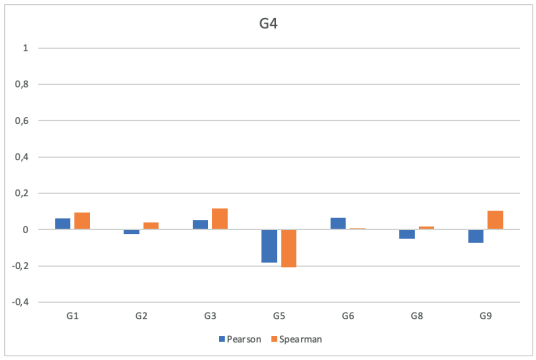


Fig. A5

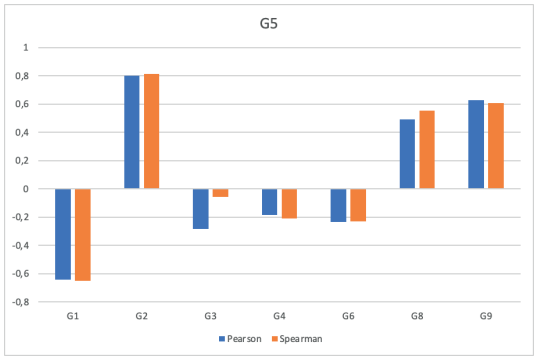


Fig. A6

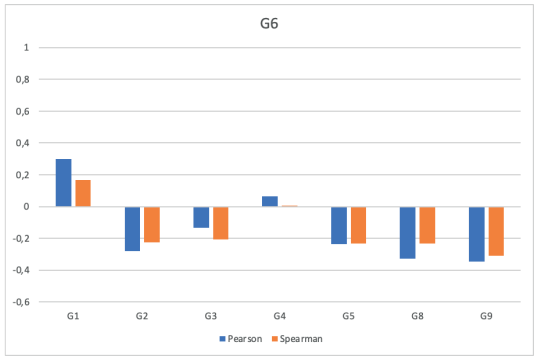


Fig. A7

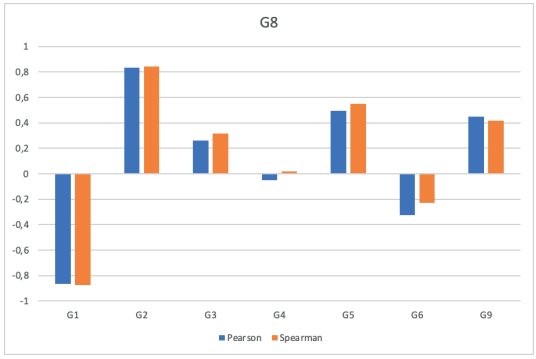
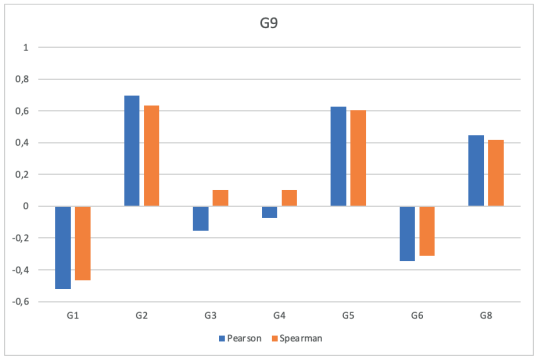


Fig. A8



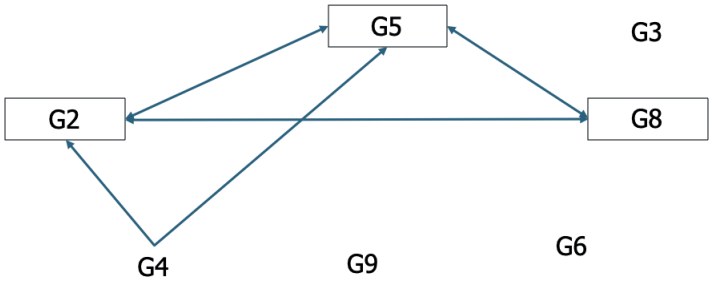
A2. Some multilinear relationships

Regression analysis makes it possible to explain some variables (notably G2, G5 and G8) as a function of these and the remaining ones, excluding G1.

The relationships that emerged from the analysis can be found in Fig. A9 while the coefficients of the joint Seemingly Unrelated Regressions (SUR) are in Tab. A4.

The level of explained variance (Adj R^2) is high at around 70%.

Fig. A9 – Diagram of interrelationships between variables



TAB. A4

Equation	Obs	Params	RMSE	"R-squared"	chi2	P>chi2
G2	26	6	1.053577	0.9217	545.65	0.0000
G5	26	6	.1713415	0.7852	151.94	0.0000
G8	26	6	.3287235	0.8288	217.90	0.0000

	Coefficient	Std. err.	z	P>|z|
G2				
G3	.2915544	1.386321	0.21	0.833
G4	10.97239	5.222185	2.10	0.036
G5	5.444035	.6053172	8.99	0.000
G6	8.643975	5.446984	1.59	0.113
G8	2.963321	.2449277	12.10	0.000
G9	.9644935	.5153654	1.87	0.061
_cons	-16.31599	8.253098	-1.98	0.048
G5				
G2	.1552797	.0172654	8.99	0.000
G3	-.2140888	.2331845	-0.92	0.359
G4	-1.869928	.8766129	-2.13	0.033
G6	-1.268695	.9305646	-1.36	0.173
G8	-.4006106	.0767571	-5.22	0.000
G9	-.1260583	.0965332	-1.31	0.192
_cons	3.38856	1.332439	2.54	0.011
G8				
G2	.3110242	.0257071	12.10	0.000
G3	.1387745	.4493048	0.31	0.757
G4	-3.174119	1.723411	-1.84	0.066
G5	-1.474158	.2824493	-5.22	0.000
G6	-2.776644	1.757594	-1.58	0.114
G9	-.3381361	.1802177	-1.88	0.061
_cons	3.893718	2.797477	1.39	0.164

As can be seen, the average sentence length (G2) is explained by the percentage of words not belonging to the basic vocabulary (G4), the number of propositions that make up a period (main and subordinate clauses) and the syntactic structure (G8).

The number of propositions (G5) is in turn related to the length of the period (G2) and the depth of the syntactic tree (G8); it is also inversely related to the number of words not belonging to the basic vocabulary (G4): "difficult" words seem to reduce the articulation of the sentence.

Finally, the depth of the syntactic tree (G8) reflects the length of the period (G2), while it is inversely related to the number of periods (G5) and the length of dependency relations (G9), even though the coefficient is significant only at 10%.

A3. Factor analysis

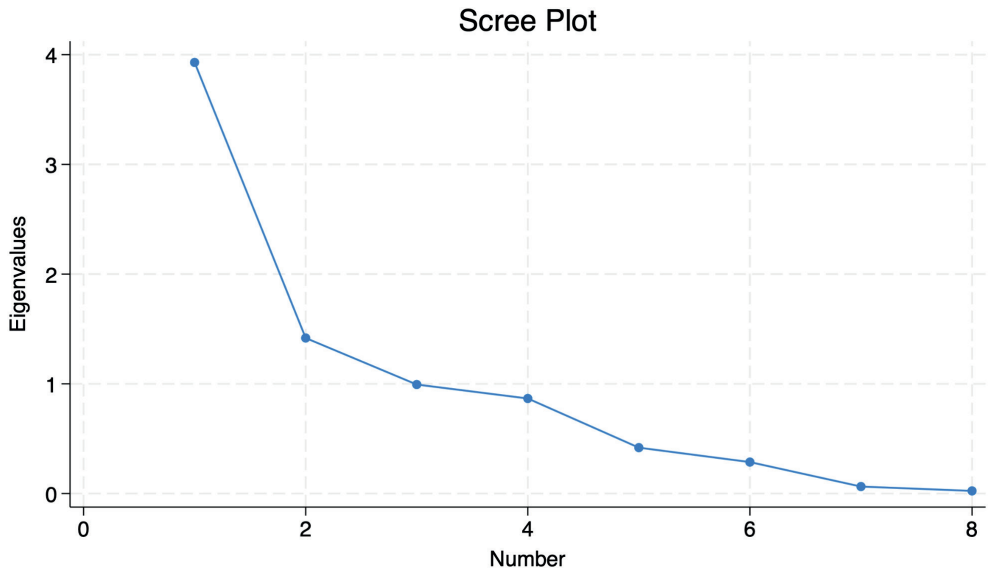
An analysis of the factorial components (PCA) attempts to identify a small number of common factors (3 in the present case) that can explain a significant share of the variability of the 8 observed variables, Gj j=1,...,8

$$G_j = F_1 b_{1j} + F_2 b_{2j} + F_3 b_{3j} + e_j$$

In more detail, the first three common factors explain 79.3% of the overall variance.

In the present case, the low degree of communality (Fig. A10) indicates that the Gj indicators analysed convey specific information that cannot be comprehensively summarised in a few common factors.

Fig. A10 – Eigenvalues and variance explained



TAB. A5

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.92918	2.51156	0.4911	0.4911
Comp2	1.41762	.424066	0.1772	0.6684
Comp3	.993555	.127123	0.1242	0.7925
Comp4	.866432	.448041	0.1083	0.9008
Comp5	.418391	.131381	0.0523	0.9531
Comp6	.28701	.223244	0.0359	0.9890
Comp7	.0637661	.0397256	0.0080	0.9970
Comp8	.0240405	.	0.0030	1.0000

Variable	Comp1	Comp2	Comp3
G1	-0.4631	-0.2431	-0.0184
G2	0.4877	-0.0457	0.1529
G3	0.0439	0.7772	-0.1777
G4	-0.0597	0.2206	0.9217
G5	0.4057	-0.3660	0.0280
G6	-0.2219	-0.1286	0.2986
G8	0.4322	0.2532	0.0190
G9	0.3764	-0.2677	0.0703