



## ***Dichotomy between private and public experience: The case of Polish wierzyć 'believe'***

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*The aim of the present paper is to analyse the semantico-syntactic structure of two Polish verbs, namely the imperfective wierzyć 'to believe' and the perfective uwierzyć 'to believe' with a view to establishing how individual mental experience (Individual Cognition) and the mental experience shared by the society (Social Cognition) are expressed linguistically. To that end, the trial version of the PWN Corpus of the Polish Language (7.5 million words) has been analysed. 403 instances of wierzyć and 558 instances of uwierzyć have been annotated manually for such features as aspect, person, number and the form and semantics of the Object. The results were then tested statistically by means of R, free software for statistical computing and graphics. The analysis showed that Individual Cognition correlates with Singular Subjects, while Social Cognition is typically represented by nominal complements and is expressed by the verb in the Imperfective Aspect.*

**Keywords:** Cognitive Corpus Semantics, the verb believe in Polish, Individual Cognition, Social Cognition, usage-based approach, Multiple Correspondence Analysis, Logistic Regression

### ***1. Introduction***

Cognitive linguistics of the 1980s and 1990s has largely focused on cognitive processes motivating language use or – to reverse the perspective – on how these processes are encoded in language (Langacker 1991; Talmy 2000; Lakoff and Johnson 1980, 1999). Despite the emphasis on language use most of the theoretical investigations were based, similarly to the practice in other theoretical strands in linguistics, on invented examples and individual intuitions of a given linguist. The advantage of such procedure is that the examples indeed illustrate exactly the point made in the theory. The disadvantage is that it describes a potential, intuitively plausible (to a given researcher) language use and not language use as it is performed in interaction.

With the emergence of language corpora created largely for commercial purposes such as the development of dictionaries and textbooks (e.g. The

Bank of English for Collins-Cobuild) new ways of investigating language use opened for linguists. The first systematic corpus-based cognitive linguistic studies appeared already at the onset of the discipline (e.g. Dirven et al. 1982; Geeraertes et al. 1994), but this type of empirical analysis gained the momentum after the session organized by Gries and Stefanowitsch at the International Cognitive Linguistics Conference in Logroño, Spain in 2004 (see Gries and Stefanowitsch 2006). Gries (2006: 1-17) lays out a set of common features of corpus linguistics stressing such elements as the representativity of machine-readable corpora allowing for systematic and exhaustive analysis of massive samples of data, which are then analysed with various statistical methods. Such study design allows the replicability of results, which is typical of all empirical sciences.

Simultaneously to the advances in methodology, the theoretical scope of the cognitive linguistic enterprise has been broadened in so far as it has been taken out of the individual mind of a speaker/hearer and placed firmly in the socio-cultural and historical context. For example, Bernárdez (2007) criticizes the COGNITION AS BRAIN metaphor as inadequate, because it focuses on cognitive processes in an individual (as if autistic) brain and completely neglects the interactive context of language use. He advocates seeing COGNITION AS ACTIVITY involving body, context, other individuals and tools, and the accumulated cultural and historical knowledge. A similar approach is represented by Zlatev et al. (2008) who investigate intersubjectivity defined as “the sharing of experiential content (e.g. feelings, perceptions, thoughts and linguistic meanings) among a plurality of subjects” (p. 1). Musolff and Zinken (2009) claim that metaphor should be investigated as it is negotiated in interaction and stress that “metaphors invite narratives – and it is the construction of the (metaphorical) narrative in the discourse community that gives the topic event meaning” (p. 5).

These developments in CL theory and methodology seem to be best represented by sociolinguistically oriented corpus cognitive studies (e.g. Geeraerts 1993; Glynn 2010; Glynn and Krawczak submitted).

The present study follows Dąbrowska (1997: 97) who notes that the grammatical organisation of utterances reveals the nature of the mental experience they describe. The aim of this paper is to analyse the meaning of the Polish verb *wierzyć* ‘to believe’ and its Perfective form *uwierzyć* in order to show how individual mental experience and the mental experience shared by the society are represented linguistically. The study is based on the PWN Corpus of the Polish Language. The qualitative and quantitative analysis of formal and semantic aspects of the verb arguments is expected to show:

- I. how Subject person and number influence the construal of Individual vs. Social Cognition
- II. how Object form (*w* ‘in’+ACC Nominal Phrase vs. *że* ‘that’ Noun Clause) and Object semantics reflect the individual and social objects of believing.

As a result we hope to show how language and the mind interact with social reality.

## 2. The Corpus and the Data

The PWN Corpus of Polish is a part of the National Corpus of the Polish Language (NKJP) and contains extracts from 386 books, 977 issues of 185 newspapers and magazines, 84 recorded conversations, 207 websites and several hundred promotional leaflets. The commercially available corpus contains 40 million words, while its demo version 7.5 million. This is the part that has been used in the present study.

The query for various morphological forms of *(u)wierzyć* returned 1008 concordance lines for *wierzyć* and 1327 lines for *uwierzyć*. Only the lines with the finite verb, i.e. a verb marked morphologically for tense, person and number were taken into account in order to investigate the first question posited above. This condition reduced the size of the analysed samples to 403 instances of *wierzyć* and 558 instances of *uwierzyć*. To achieve our second objective, i.e. to analyse the relationship between the grammar of the object on the one hand and Social and Individual Cognition on the other the set was further reduced to 350 and 466 examples respectively, as in some sentences the verb was followed by a pronominal complement or had no direct object. In such sentences the nature of the object of believing could be reconstructed on the basis of larger context and annotated as Social or Individual, but when there were no explicit grammatical objects the sentences could not be used for analyzing grammatical relations between the verb and its complementation, for instance:

- (1) Umiejętnie wykorzystaj każdą sytuację, by szepnąć mu do ucha, jak bardzo go podziwiasz (możesz wymyślać kompletne bzdury, i tak **uwierzy**). [Cosmopolitan 1998: 7]  
(Skillfully take advantage of every situation to whisper in his ear how much you admire him (you can talk complete rubbish, he will **believe** [Perf] [you] anyway)

In the example above, what is believed is the ‘complete rubbish, how much you admire him’ but the verb ‘believe’ does not have an explicit direct object, so while the semantic content of believing can be reconstructed, the grammatical form of the object could not be determined. In this sentence we considered the object of cognition to be individual. The operationalisation of Social and Individual Cognition as well as the illustration of our coding schema are presented in the next section.

## 3. The Variables

Every sentence was coded manually by two independent coders with respect to 4 variables: the person (first, second and third) and number (singular or plural) of the verb, the grammatical form of the Object (clause or NP) and the semantics of the object (Individual or Social Cognition). Illustrative examples are presented below:

- (2) Oczywiście nikt nie wierzy w koniec wojny w tym roku . (3rd person, sg, NP, Social)  
(Of course nobody believes in the end of war this year.)

In sentence (2) the subject of the sentence is third person singular (also marked morphologically by the verb ending), the direct object of the verb is a nominal with the analytical grammatical case – Accusative marked both by the preposition *w* ‘in’ and the noun ending. The end of war is a social fact available to various participants of the social interaction; hence we consider it Social Cognition. It may seem that plural subjects will automatically and exclusively collocate with Social Cognition, and in most of the analysed examples it is the case, when we deal with propositional statements about the content of belief. But when the believing is contextually grounded in different forms of interaction, it is not necessarily the case. There are two typical situations in which a verb in the plural co-occurs with Individual Cognition, as shown in (3) and (4):

- (3) Jestem z nim ponad 4 lata i **uwierzcie** mi, nie jest ideałem. (2<sup>nd</sup> person Imperative, pl, Clause, Individual)  
(I have been with him for four years and believe me, he is not an ideal.)
- (4) Według jego relacji - dzień wcześniej, podczas kąpieli chłopczyk wypadł mu z ręki, z wysokości około jednego metra. (...) Lekarze nie **uwierzyli** jednak jego relacji. (3<sup>rd</sup> person, Indicative, pl, NP, Individual)  
(According to his account, a day before, in the bath the boy slipped out of his hand and fell about 1 metre down. (...) The doctors did not, however, believe his account.)

In sentence (3) the speaker of the sentence is trying to convince a group of others to her point of view. The verb *uwierzcie* ‘believe’ is a 2<sup>nd</sup> person plural imperative form combining with Individual Cognition. In sentence (4) the form of the verb is 3<sup>rd</sup> person plural indicative, and the verb is negated. In this case the group denoted by the plural verb and the plural Subject – ‘doctors’ did not believe the account of the caretaker, i.e. they did not share his Individual belief. The example below illustrates what we viewed as a representative example of Individual Cognition:

- (5) Osobiście wierzę, że nie jest to prawdopodobne. (1<sup>st</sup> person, sg, Clause, Individual)  
(I personally believe that it is most unlikely.)

Sentence (5) has a 1<sup>st</sup> person singular subject and a clausal complement, specifically a *that*-clause. Both the adverb of manner modifying ‘believe’, i.e. ‘personally’, and the subjective evaluation of the situation have been coded as Individual Cognition. The next section presents the results of the analysis conducted with the use of R – free software for statistical computing and graphics (for applications to linguistics see Gries 2009).

#### 4. Data Analysis

In the first, exploratory stage of the analysis Multiple Correspondence Analysis was used to show if there are any patterns in the data that could correlate specific grammatical features of the Subject and the Object of the verb 'believe' with the semantic feature of Social or Individual Cognition as defined in the previous section. Multiple Correspondence Analysis is a descriptive statistical technique for an analysis of nominal rather than continuous categorical variables. Unlike a simple chi-square test used to analyse contingency 2x2 tables, it allows the analysis of a larger number of variables. It treats columns in the dataset as categories of variables and rows as individuals. The associations between variables are then represented graphically as maps. Variables appearing in the vicinity of one another tend to correlate in the dataset, whereas those further apart do so to a lesser extent.

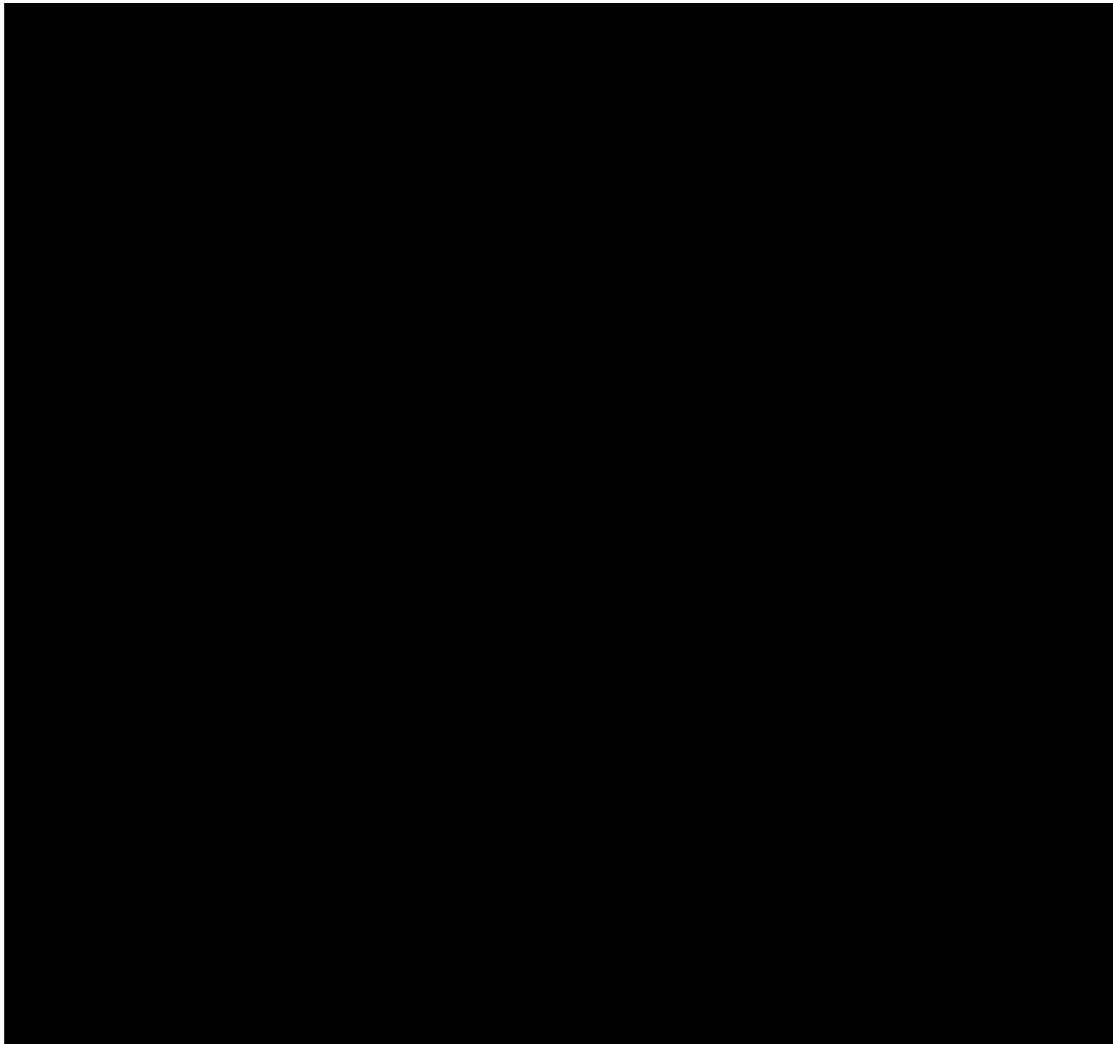


Figure 1. Multiple Correspondence Analysis of Subject person, Subject number, Non-perfective *wierzyć* (N=403), Perfective *uwierzyć* (N=558) and Social and Individual Cognition.

As represented in Figure 1, Individual Cognition strongly and distinctively correlates with the 2<sup>nd</sup> person Subjects: the position of the variable: Indiv (Individual Cognition) separates V2 (2<sup>nd</sup> person Subject) from Soc (Social

Cognition). This strong correlation may also be a result of an additional variable, which we haven't taken into account, that is Imperative mood. It is the second person Imperative used for convincing others to the Speaker's point of view that correlates with Individual Cognition. Singular Subjects: VSg are equidistant from either Individual or Social Cognition, hence Singular Subjects do not seem to show a preference for either type of cognition. 1<sup>st</sup> and 3<sup>rd</sup> person Subjects as well as Plural Subjects seem to be more attracted to Social than to Individual Cognition. Also the perfective form of the verb 'believe' *uwierzyć* appears to correlate better with Individual Cognition, while the Imperfective *wierzyć* with Social Cognition. The correspondence between Individual Cognition and the Imperfective 2<sup>nd</sup> person singular *uwierzyć* can be illustrated with the following example:

- (6) *Uwierz mi, że kiedy ciebie nie ma, uwodzi twoich kumpli aż miło.*  
 (Believe me [Imperative] that when you are not here, she seduces your buddies all she wants)

The Perfective *uwierzyć* is conceptually motivated by the prefix *u-*, which derives from the spatial preposition *u*, vaguely equivalent to the English preposition *at*. It represents an image schema, where the LM is construed as a collection of entities among which the selected TR is located (Przybylska 2002). In a combination with the Imperative Mood and Clausal complement the constructed scene is that of the Speaker trying to convince the Hearer to their version of the situation, their Individual Cognition.

The correspondence between Social Cognition and 3<sup>rd</sup> person Plural Subject is best illustrated by example (7):

- (7) *Obydwaj wierzyli w malarstwo, które wyraża życie.*  
 (They both believed in painting, which represents life.)

Here a mental act of believing is predicated about two people who share a belief in something that is perceptually cognizable, intersubjectively accessible, i.e. Social Cognition.

The data used to explore the interaction between Subject form and the construal of Individual vs. Social Cognition were further tested with the non-adjusted Burt matrix method proposed by Greenacre (2007), the results of which are presented below:

```
> mca1 = mjca(a, lambda = "Burt")
> summary(mca1)
```

Principal inertias (eigenvalues):

dim	value	%	cum%	scree plot
1	0.173477	46.0	46.0	*****
2	0.121053	32.1	78.0	*****
3	0.038510	10.2	88.2	****
4	0.032532	8.6	96.9	***
5	0.011873	3.1	100.0	
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Total:		0.377445	100.0	

The 78% of explained inertia show that in selecting the variables for analysis we have achieved a very stable result.

Figure 2 below represents a Multiple Correspondence Analysis showing the interaction of three variables: Individual and Social Cognition, the grammatical form of the object and the aspectual form of the verb 'believe'.

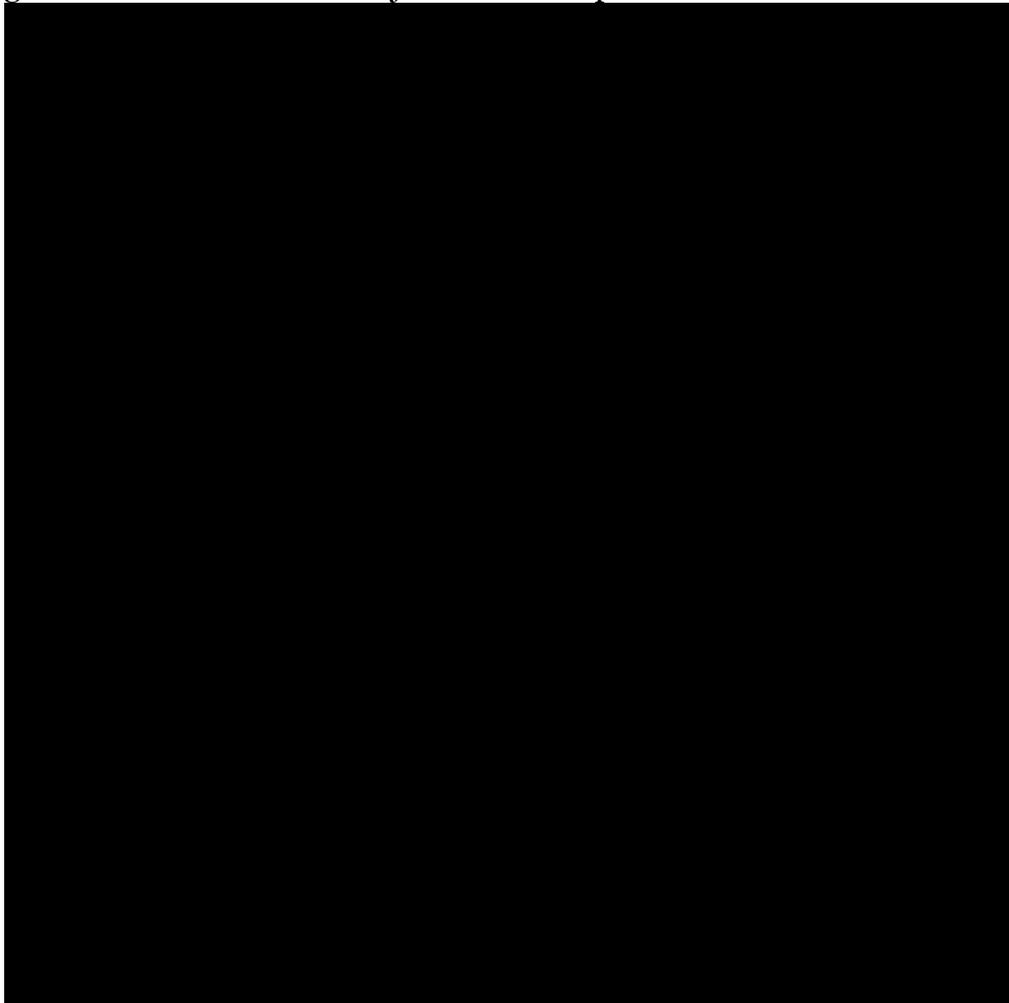


Figure 2. Multiple Correspondence Analysis of Individual and Social Cognition, Object form and verb Aspect.

In Figure 2 Individual Cognition correlates highly with the clausal complement (ObjClause), while Social Cognition with the nominal complement (ObjNP). Examples (4) and (5) above can be considered a good illustration of these tendencies. The explained inertia calculated with the same non-adjusted Burt matrix method (Greenacre 2007) gives the value of 83.3%, which is a very good result clearly indicating the importance of object form for the interpretation of the meaning of the verb *wierzyć* 'believe'.

Danielewiczowa (2002), in her extensive study of epistemic verbs in Polish, also suggests that the grammatical form of the complement may serve to differentiate between various epistemic states and discusses it on the basis of the contrast in meaning between *wiedzieć, że* 'to know that' and *wiedzieć o* 'to know about'. Using formal analysis of invented examples she shows that the clausal complementation is employed to express propositional knowledge, whereas nominal complementation is employed to refer to abstract situations or persons.

These observations corroborate our own analysis, which indicates that to make individual experience intersubjective, i.e. social, the necessary step is to reify the abstract concept (on application of Kotarbiński's reism to cognitive linguistics see Szwedek 2007). Reification at the conceptual level is codified as nominalisation at the linguistic level (Radden and Dirven 2007; Langacker 2008). Representing perceptually inaccessible, hence also intersubjectively inaccessible, situations and persons into THINGS seems to make them more cognitively tangible and hence more likely share-able by a number of speakers. In particular, conceptualizing situations as containers that can be entered by more than one speaker creates a shared cognitive space accessible to the interlocutors in a speech act.

The analyses of the results presented in Figure 2 and 3 allow us to formulate a number of hypotheses concerning the correlation between Social and Individual Cognition and the formal features of the sentence representing either of these two types. The hypotheses are:

- I. Individual Cognition correlates with clausal complementation
- II. Individual Cognition correlates with 2<sup>nd</sup> person subjects
- III. Individual Cognition correlates with the Perfective aspect of the verb 'believe': *uwierzyć*
- IV. Social Cognition correlates with nominal complementation
- V. Social Cognition correlates with the imperfective form of the verb 'believe': *wierzyć*.

To further investigate these hypotheses we will employ the statistics used in decision analysis. It yields even more promising results, as shown in Figure 3.

The highest predictive power is accorded to the distinction of Number as shown in ellipsis 1 in Figure 4. For the group of Singular Subjects the second most significant feature is that of Aspect. For the combination of Singular

Subjects with the Perfective Aspect: *uwierzyć*, the third decision step is the distinction between Object Forms with clausal complements predicting Individual Cognition in almost 80% of cases. Example (6) discussed above is an illustration for this set of features. The combination of the Singular Subject with the Perfective Aspect and a nominal complement is far less distinctive.

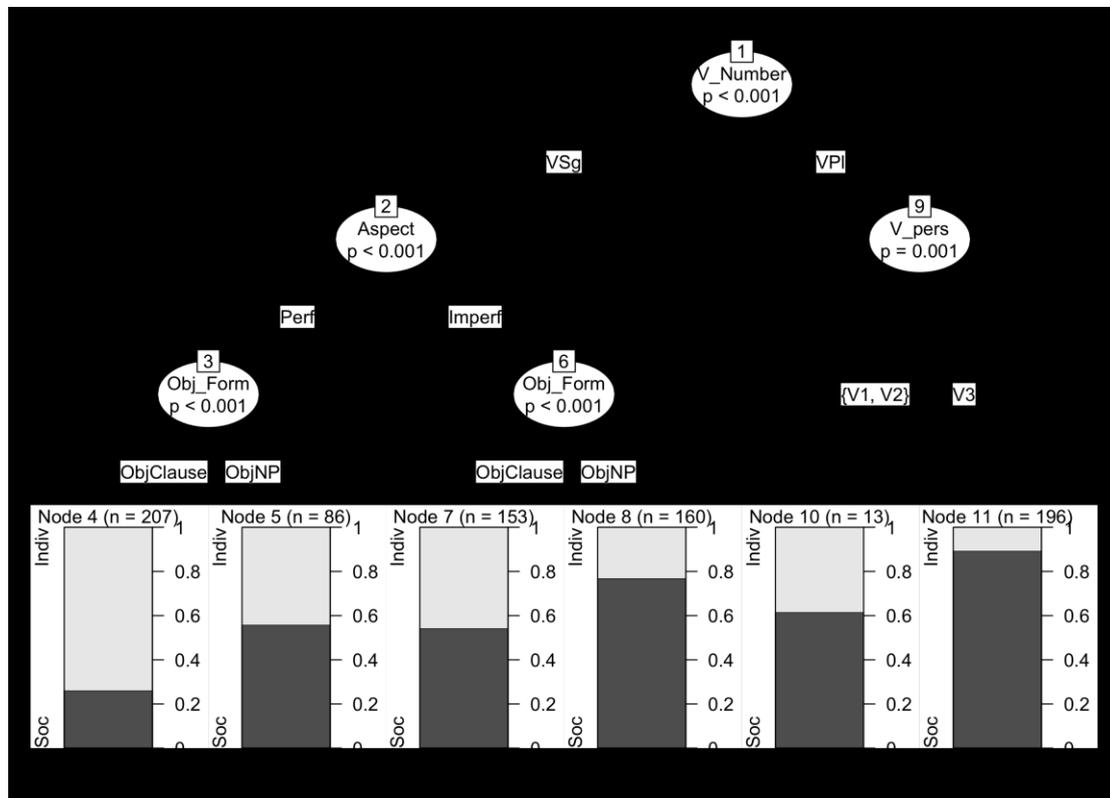


Figure 3. Decision tree for Individual and Social Cognition.

When it comes to Singular Subjects combined with Imperfective Aspect: *wierzyć* – the nominal complements predict Social Cognition in almost 80% of the cases, while clausal complements do not seem to be distinctive. This can be illustrated by example (8) below:

- (8) Czy wierzy Pan w UFO?  
(Do you believe in UFO?)

In sentence (8) a Singular Subject of Imperfective verb ‘believe’ is complemented by a nominal object. Such Object as ‘UFO’, while not perceptually accessible for other people, is a part of social habitus, shared cultural knowledge of a speech community.

In the case of Plural Subjects, the Subject Person seems to be of significance so that a combination of the Plural and the 3<sup>rd</sup> Person Subject predicts Social Cognition in approximately 90% of the cases, as shown in example (9):

- (9) ...zwalczajcie tych, którzy nie wierzą w Boga...  
(...fight those, who do not believe in God...)]

To test the strength of our predictions, the five hypotheses enumerated on p. 8 will be further tested with the help of inferential statistic technique of Logistic Regression. Logistic Regression is a form of confirmatory data analysis, which shows to what extent the tendencies observed with the help of exploratory techniques have the predictive power. In other words, would a computer programme, given the statistical information about the combination of the analysed variables, correctly predict the type of cognition (Individual or Social) to which the utterance described by such a combination of variables refers? The results of the Logistic Regression are given in Figure 5.

Deviance Residuals:				
Min	1Q	Median	3Q	Max
-2.7199	-0.8518	0.3891	0.7276	1.8349

Coefficients:				
	Estimate	Std. Error	z value	Pr(> z )
(Intercept)	1.3510	0.2888	4.677	2.91e-06 ***
Aspectwierzyc	1.0410	0.1846	5.638	1.72e-08 ***
V_persV2	-0.4998	0.3228	-1.549	0.121
V_persV3	0.1510	0.1958	0.771	0.441
V_NumberVSg	-2.3292	0.2517	-9.254	< 2e-16 ***
Obj_FormObjNP	1.1309	0.1730	6.537	6.27e-11 ***

Null deviance: 1095.37 on 814 degrees of freedom  
Residual deviance: 880.83 on 809 degrees of freedom  
AIC: 892.83

P	C	R2	Brier
0	0.785	0.313	0.182

Figure 5. Logistic Regression for Individual (N=324) and Social Cognition (N=491) for the following predictor variables: Aspect, Subject Person and Number and Object Form.

The first column on the left shows the features that the exploratory analysis suggested as correlating with either Individual or Social Cognition. The 'Estimate' column suggests the relative importance of the feature for predicting Individual or Social Cognition. The negative scores predict Individual Cognition, while the positive scores predict the Social Cognition. The far right column shows the levels of significance, or *p*-values. The *p*-values show that Aspect, Number and Object Form are statistically significant. Imperfective Aspect, i.e. the use of the verb *wierzyć*, correlates significantly with Social Cognition. Singular Subjects are high predictors of Individual Cognition and the Nominal complement of Social Cognition. These results confirm our hypotheses (IV) and (V), but not the hypotheses (I)-(III). Logistic Regression also points to the Singular Subject as a high predictor of Individual Cognition, which we have not noticed in the MCA analyses, but which has been indicated as the strongest predictor by the decision tree. The 2<sup>nd</sup> Person Subjects are a high predictor for Individual Cognition, but they remain statistically insignificant due to their low occurrence in the whole dataset (N=85 in the total of N=816).

The bottom line of Figure 5 shows the explanatory power of the model. The coefficient of determination  $R^2$  (0.313) gives a relatively high predictive power to the model, however the C-score (0.785) with the value slightly below 0.8 is less optimistic. Such results suggest that the variables we have proposed as relevant to the Individual vs. Social distinction require further fine-tuning. This could be achieved either by selecting a specific genre of text or by adding further variables such as Mood. More sensitivity to genre would allow the control of inter-genre variability, which may be an important factor. A distinction between Imperative and Indicative could help further differentiate between various uses of second person Subjects.

## 5. Conclusion

The results of the corpus analysis of the use of the verb *wierzyć* and its Perfective form *uwierzyć* show that Individual Cognition highly correlates with Singular Subjects. That means that in the investigated corpus the conceptualisers were less likely to attribute Individual Cognition to collective Subjects. When it comes to complementation patterns, what we have called Social Cognition, i.e. beliefs that can be shared by a given speech community, is prototypically represented by nominal complements. Complements with NPs, such as ‘to believe in God’ or ‘to believe in UFO’ (examples (8) and (9) respectively) in formal language of philosophy would be translated as ‘to believe that God/UFO exists’. However, the reification and nominalisation construe the existence of these inaccessible entities as given and unquestionable. Similarly, in sentence (2) the belief in the end of war can be questioned, but that the war can have a clear end, is taken for granted. Clausal complementation allows for a more detailed construal of the situation and as such seems to be more frequently employed for expressing Individual Cognition. However, this tendency is not statistically significant. Finally the Imperfective form of the verb: *wierzyć* ‘believe’ significantly correlates with Social Cognition indicating that shared beliefs enjoy a certain continuity and are less likely to be represented as punctual events.

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