# Causation (and Some Other) Paraphrasing Patterns in L1 English. A Case Study

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# Abstract

The present paper reports on a study aimed at testing the coverage of the Meaning-Text paraphrasing system by applying its rules to account for eighty paraphrases of an English sentence produced by eight native speakers of that language. We focus on "deep" paraphrasing links, in particular causation links, which can only be laid bare through semantic decompositions of lexical units involved. The results of the study corroborate the initial assumption that most of the paraphrasing links found in our mini corpus can be described in terms of the already existing paraphrasing rules. New paraphrasing rules are proposed for the small number of paraphrasing links hitherto unaccounted for.

# **1** Introduction

We start by characterizing the core linguistic concepts used in the study reported in the paper (Section 1.1) and presenting the study goals (Section 1.2).

# 1.1 Paraphrasing and its Modeling

As a particular case of synonymy, paraphrase, or (near-)synonymy of sentences, plays a crucial role in language acquisition and use (Žolkovskij & Mel'čuk 1967: 177, Fuchs 1980: 354ff, Matinot 2009, among others). An average speaker of language L is capable of producing and recognizing sentences of L that stand in the relation of paraphrase. Such sentences, illustrated in (1), are called (mutual) paraphrases, and the operation whereby they are produced is known as paraphrasing. (In this article, the converse operation of paraphrase recognition will be left aside.)

(1) a. John's comfortable income enables him to travel frequently.
b. John's comfortable income allows him to travel often.
c. John makes a lot of money; therefore, he is able to travel a lot.

Paraphrasing is recurred to both in everyday linguistic exchanges and in more complex writing and translation tasks—whenever there is a need to make oneself clearer, change one's style or find a more felicitous expression for the meaning to be conveyed. It is only normal, then, that paraphrases and their production are of great interest for theoretical linguistics, applied linguistics, translation and, more broadly, philosophy of language, logic and various other disciplines.

One of the most advanced models of paraphrasing proposed to date is the Meaning-Text paraphrasing system, introduced in Žolkovskij & Mel'čuk 1967 and further developed in several publications to be mentioned below: a set of rules that establish (quasi-)equivalences between linguistic elements (semantemes within meaning configurations, lexical units within syntactic constructions, and so on) at specific levels of representation of sentences recognized by Meaning-Text linguistic models. Meaning-Text paraphrasing system is characterized by an extensive coverage of linguistic phenomena involved in paraphrasing and cross-linguistic validity, thanks to the universally applicable formalisms used to formulate its rules.

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There are two major types of paraphrasing rules. Lexical-syntactic paraphrasing rules, which operate at the deep-syntactic representation level, are based on lexical relations between lexical units involved— semantic-derivational (in a broad sense) and collocational—and syntactic constructions within which they appear. They treat quite sophisticated paraphrases, albeit less "deep" than those covered by semantic paraphrasing rules, which operate at the semantic level of representation and account for paraphrases that require semantic decomposition of lexical units present in the corresponding sentences. In this paper, we will see examples of both these rule types, while focusing on the latter, less well-developed and not as well-known as the former.

# 1.2 Goals of the Study

Our study intended to test the coverage of the Meaning-Text paraphrasing system by applying its rules to describe paraphrastic links in a corpus of paraphrases produced by native speakers of English.

The corpus consisted of eighty paraphrases of sentence (1a) above, organized around a causation verb (*to enable*) linking two facts ('John has a lot of money' and 'John travels a lot'), chosen for its rich paraphrastic potential. The paraphrases were produced by the fourth year anglophone university students superficially initiated into the concept of paraphrasing and given minimal instructions as to how to go about the task at hand.

The immediate goals of the study were theoretical in nature, namely:

- look into paraphrastic diversity in the corpus, i.e., lexical and syntactic paraphrasing means used, and limits of paraphrastic variation;
- determine whether the existing Meaning-Text paraphrasing rules can account for the paraphrases in this particular corpus;
- if necessary, suggest new paraphrasing rules.

The assumption, corroborated by the study results, was that many, but not all, paraphrases in the corpus can be described in terms of the already existing paraphrasing rules.

No attempt was made to evaluate paraphrasing competence of the speakers (this task was left for a future study).

# 2 Global Analysis of the Corpus of Paraphrases

# 2.1 Quality of the Paraphrases

All sentences in the corpus were paraphrases of (1a) and grammatically correct; a few contained redundancies and/or stylistically marginal lexical choices, for instance:

- (2) a. The wages John experiences [choice of the collocate]  $\rightarrow$  is paid give him a lot of travel opportunity. [Better: The pay J. receives <earns>...]
  - b. John's  $revenue_{[paradigmatic lexical choice]} \rightarrow income$ , earnings is/are such that he can travel often without economic\_{[paradigmatic lexical choice]} \rightarrow financial pressure.

Some paraphrases featured elements of pragmatic knowledge; i.e., they were not strictly linguistic paraphrases of (1a); here are some such pragmatic equivalences:

- (3) a. [travel] *a lot* ~ [travel] *several times a year* 
  - b. travel ~ go on vacations ; take excursions ; get to see the world
  - c. [allow ...] to travel ~ [permit] the luxury of travelling
  - d. enable [to travel] ~ grant the freedom [to take trips]

In most cases, paraphrastic variation involved the propositional content and/or communicative orientation, a.k.a. information structure (Mel'čuk 2001; Féry & Ishihara 2016, eds); stylistic variation was present to a lesser degree. Both the global variation (affecting the overall organization of the sentence) and the local one (affecting individual sentence elements) were present.

The paraphrases in the corpus were lexically rich and structurally diverse. The vast majority were approximate paraphrases, with different degrees of semantic proximity: from very close to quite distant.

#### 2.2 Paraphrastic Variation Found in the Corpus

Paraphrastic variation was measured according to two parameters, indicated in Table 1:

DIMENSIONS OF MEANING INVOLVED	SCOPE OF VARIATION
propositional content	global
communicative orientation	local
style (register)	

Table 1: Parameters used to determine paraphrastic variation in the corpus

Two paraphrases can differ along any or all three dimensions of meaning. With each dimension of meaning, the scope of variation can be either global or local. The variation can target one or more elements of the initial sentence. Consequently, several paraphrasing rules of different types may be necessary in order to produce just one pair of paraphrases.

On the one hand, paraphrastic variation is correlated to the depth of the paraphrasing link: generally speaking, the more radical the variation, the deeper the level of sentence representation at which it can take place. On the other hand, paraphrastic variation correlates with the exactness of the paraphrasing link: the more variation there is, the greater likelihood to get an approximate paraphrase of the starting sentence.

Global paraphrastic variation found in our corpus is represented in Tables 2 and 3 (for a full list of paraphrases, see Appendix):

	2-CLAUSE REALIZATION						
P = 'John has money'; Q = 'John can travel'							
	plemented as the main predication/matrix clause.						
	ative clauses are considered clause elements (parts of clauses). <sup>1</sup>						
A Coordination							
P: corroboration Q	John must make a ton of money: he goes on vacation all the time.						
P; consequently Q	John makes a lot of money; therefore, he is able to travel frequently						
B Subordination							
B1 Main fact: P							
P, which Q <sub>'cause'</sub> <p, causes="" q="" which=""></p,>	John makes good money, which permits him to take a lot of trips. John is paid well, which is why he can go on so many vacations.						
B2 Main fact: Q							
Q caused by P	John can travel lots since he has a comfortable income.						
	John goes on a lot of trips because he's well off.						
Not Q if not P	If John didn't make as much as he does, he wouldn't travel as often.						

Table 2: Two-clause realizations of paraphrases	Table 2: Two-c	lause rea	lizations	of par	aphrases
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	1-CLAUSE REALIZATION
C1 Main fact: causation P causes Q Q is caused by <is a="" of="" result=""> P</is>	John's earnings allow him to travel a lot. John's frequent vacations have been enabled by his comfortable salary Being able to travel a lot is a result of John's good salary.
C2 Main fact: P P suffices for Q P is a reason for Q	John earns enough money to afford to travel often. The money [that John makes] is sufficient to pay for all the trips he takes The reason why John is able to take so many trips a year is his grea revenue.
C3 Main fact: Q Q is caused by <linked to=""> P</linked>	John can travel lots since he makes a comfortable amount of money. Due to a nice income, John goes on many trips.
	John's frequency of travel is correlated to his high remuneration.

Table 3: One-clause realizations of paraphrases

# 2.3 Semantic Proximity of the Paraphrases in the Corpus

Example (4) illustrates different degrees of semantic proximity between the starting sentence (1a), repeated here as (4a), and some of its paraphrases from our corpus.

<sup>&</sup>lt;sup>1</sup> An example of a nominal relative clause (bolded), which is a part of the syntactic subject of the sentence: *The money* [*that John makes*] *is sufficient to* .... In contrast, a sentential relative clause, for example, *John makes good money*, [*which permits him to* ...] counts as a clause in its own right. For these terms, see Quirk *et al.* (1985: 1118*ff*).



Sentences (4a-b) are exact mutual paraphrases; they do not differ with respect to any dimension of meaning (in other words, their semantic representations are identical) and feature only local lexical differences (*enable* vs. *allow* and *frequently* vs. *often*), as well as different pronominalizations (*John's* [income] vs. *his* [income] and [enables] *him* vs. [allows] *John*).

Sentences (4c-d) are approximate mutual paraphrases, differing slightly in their propositional contents (*thanks to* [expressing 'cause'] vs. *with* [expressing 'means'] and the omission of 'able' in the second sentence), but having the same communicative and stylistic orientation.

As for sentences (4a-b) and (4c-d), they are more remote approximate paraphrases, as they differ not only in some aspects of their propositional meanings but also in their respective communicative organizations, reflected in their globally different syntactic structures.

We could go on with the comparisons, but what has been said seems enough to illustrate the fact that paraphrases can differ more or less substantially with respect to their semantic, communicative and/or stylistic features, ranging from very close to quite distant. Needless to say, the greater the semantic distance between paraphrases, the more interesting and difficult their description becomes.

# **3** Types of Paraphrastic Links Found in the Corpus and Corresponding Paraphrasing Rules

Three types of paraphrastic links, or paraphrastic equivalences, were found in the corpus: 1) lexical syntactic equivalences, 2) (exact) semantic equivalences and 3) semantic quasi-equivalences. We will take them in turn, along with the corresponding paraphrasing rules.

### 3.1 Lexical-Syntactic Equivalences

These are the equivalences between lexical items and syntactic constructions within which they appear. In the simplest case, they involve local variation of the propositional content based on synonymic substitutions, some of which are exact and some approximate; cf.:

John's his	comfortable income high earnings high salary comfortable returns adequate funds	enables permits allows lets	him John	<ul> <li>(to) travel</li> <li>(to) go on trips</li> <li>(to) take trips</li> <li>(to) do trips</li> <li>(to) go travelling</li> </ul>	a lot lots frequently often regularly	
2x	5x	4x	2x	5x	5	= 2 000

 Table 4: Some lexical-syntactic equivalences found in our corpus

Note the large number of paraphrases that can be obtained by these relatively simple substitutions, illustrating the high paraphrastic potential of Language.

Paraphrases of this type are modeled by means of well-known lexical-syntactic paraphrasing rules (Žolkovskij & Mel'čuk 1967; Mel'čuk 1974: 141-176, 1992, 2013: 137-197). These rules, formulated in terms of lexical functions (Mel'čuk 1974: 78-109; Wanner, ed., 1996; Mel'čuk & Polguère 2021), operate on dependency-based Deep-Syntactic Structures (DSyntSs) of sentences and are, just like the formalisms in which they are couched, cross-linguistically universal.

Two equivalent DSyntSs and two lexical-syntactic paraphrasing rules that relate them are given in Figs 1 and 2 below.

REMARK. In these DSyntSs and paraphrasing rules, we see the following lexical functions: Oper1 (a particular light verb), S<sub>0</sub> (a nominalization), Magn<sup>FREQ</sup> (an intensifying collocate bearing on the frequency of occurrence of the fact denoted by the base of the collocation) and Syn (a synonym of a lexical unit).



Figure 1: DSyntS of (1a) and an equivalent DSyntS



Figure 2a: Light verb fission (Rule<sup>EQ\_EX-SYNT</sup> 1) Figure 2b: Synonymic substitution (Rule<sup>EQ\_EX-SYNT</sup> 2)

The rule in Fig. 2a allows for the substitution (to)  $travel_{(L(V))} \sim$  (to)  $take < do, go \ on >_{(Operl)} trips_{(S0(L(V)))}$ , and that in Fig. 2b accounts for the substitution (to)  $enable_{(L)} \sim$  (to)  $allow_{(Syn(L))}$ .

Meaning-Text paraphrasing system contains some hundred rules of the type illustrated in Fig. 2, capable of treating a wide range of quite sophisticated lexical-syntactic paraphrases.

#### **3.2 Semantic Equivalences**

Semantic equivalences fall into two major subtypes. Semantic-propositional equivalences are based on the operation of semantic decomposition, allowing for a description of a given non-elementary lexical meaning 's' in terms of the meanings simpler than 's'.<sup>2</sup> In our approach, these equivalences are modeled by means of semantic expansion/reduction rules—actually, (part of) lexicographic definitions of corresponding lexical units (see Fig. 4 below). These rules operate on semantic structures [SemSs] of sentences and are needed to discover semantic paraphrastic links, not accessible at the deep-syntactic level of representation. They are language specific (depending on the available lexical stock), but their formal type is cross-linguistically universal.

Semantic-communicative equivalences hold between configurations of communicative markers, i.e., specific distributions of values of communicative oppositions such as Thematicity, Givenness, Focalization, etc. They are modeled by means of semantic-communicative restructuring rules, relatively new and less widely known than the decomposition rules (see, for instance, Milićević 2007a: 231-245).

Sentence (4c) is an approximate paraphrase of sentence (1a), differing from it both in the propositional content and communicative orientation. Let us demonstrate how our semantic paraphrasing rules can be used to produce the former from the latter. The underlying representations of (1a) and (4c) follow:

<sup>&</sup>lt;sup>2</sup> A meaning 's<sub>1</sub>' is simpler than the meaning 's<sub>2</sub>' if 's<sub>1</sub>' can be used within the decomposition of 's<sub>2</sub>' and the converse does not hold. Thus, 'look' is simpler than 'stare' since 'stare' = 'look in a particular way' and 'look'  $\neq$  'stare in a particular way.'







We start by decomposing the semanteme 'enable' in the SemS of (1a), using (the equivalence part of) the rule indicated in Fig. 4 below: 'income<sub>x</sub> enables John<sub>y</sub> to travel<sub>z</sub>' = 'income<sub>x</sub> causes that John<sub>y</sub> is able to travel<sub>z</sub>.' This allows us to "extract" the semantemes '(to) cause' and '(be) able.' We proceed to a restructuring of the semantic-communicative structure of (1a), applying to it the rule in Fig. 5, which moves the theme ~ boundary and changes the communicatively dominant semanteme of the semantic rheme from '(to) cause<sub>x</sub>' (extracted from '(to) enable') to '(be) able<sub>z</sub>'.<sup>3</sup>



Figure 4: A semantic expansion/reduction rule (using the lexicographic definition of ENABLE(V, trans))



Figure 5: A semantic-communicative reconstruction rule

In the subsequent lexicalization and arborization of the representation underlying sentence (4c), '(be) able' is expressed as the main predication, while 'to.cause' is implemented by a prepositional phrase *thanks to* N.

Other implementations of this representation are of course possible; they may involve only alternative expressions of the propositional content or a change of the propositional content itself (requiring the application of additional paraphrasing rules), resulting in more distant paraphrases of (4c); cf.:

thanks to	John's	comfortable income	he	is able	(to) travel	a lot	
because of due to owing to as a result of	his	high earnings high salary comfortable returns adequate funds	John	is free has the ability has the opportunity can can allow himself can afford	(to) go on trips (to) take trips (to) do trips	lots frequently often regularly	
				gets manages			
5x	2x	5x	2x	9x	4x	5	= 18 000

Table 5: Some paraphrases of sentence (4c)

<sup>&</sup>lt;sup>3</sup> A communicatively dominant semanteme of a Thematic/Rhematic area (defined over a SemS) is the semanteme to which the entire area can be reduced—a sort of a minimal paraphrase of this area.

#### 3.3 Semantic Quasi-Equivalences

These equivalences underly approximate paraphrases such as those in (5) below; the starting sentence (1a) is repeated for convenience as (5a):

- (5) a. John's comfortable income enables him to travel frequently.
  - b. John makes a lot of money; therefore, he is able to travel frequently.
  - c. If John didn't make as much as he does, he wouldn't travel so often.
  - d. John makes enough money to be able to travel a lot.
  - e. With a comfortable income, John goes travelling quite a bit.
  - f. John must make a ton of money: he goes on vacation all the time.

They are modeled by means of semantic quasi-equivalence rules (Milićević 2007a: 190-230, 2007b, 2021), global substitution rules which manipulate very general meanings, close to semantic primitives (Wierzbicka 1996, 2021), and are most likely universal.

Quasi-equivalence rules necessary to relate sentence (5a) to its paraphrases (5b)-(5f) are indicated in Table 6 below; all but the last one had been previously identified and described within the Meaning-Text approach.

(5a) to (5b)	CAUSE ~ CONSEQUENCE	'P causes $Q' \cong$ 'P, consequently Q'	$\checkmark$
(5a) to (5c)	CAUSE ~ CONDITION	'P causes $Q' \cong$ 'If (not) P, then (not) Q'	$\checkmark$
(5a) to (5d)	CAUSE ~ SUFFICIENT CONDITION	'P causes $Q' \cong$ 'P is sufficient for Q'	$\checkmark$
(5a) to (5e)	CAUSE ~ MEANS	'P causes $Q' \cong$ 'By.means.of P, Q'	$\checkmark$
(5a) to (5f)	CAUSE ~ CORROBORATION	'P causes $Q' \cong$ 'P, as.corroborated.by Q'	Х

Table 6: Semantic quasi-equivalences between sentences in (5) and the corresponding paraphrasing rules

The CAUSE ~ CONSEQUENCE rule written in the semantic network formalism is given in Figure 6:

$$\begin{array}{ccc} & & & & & \\ & & & & \\ \circ & & & 1 & 2 & \circ \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & &$$

Figure 6: A semantic quasi-equivalence rule (a global substitution)

The application of semantic quasi-equivalence rules invariably requires prior semantic decompositions of meanings present in the initial semantic structure (carried out by semantic expansion/reduction rules introduced in section 2.1) in order to extract the semantic component(s) they manipulate—in our case, the semanteme '(to) cause'. They also regularly trigger major modifications of the communicative structure of the initial sentence (performed by semantic-communicative reconstruction rules like the one in Fig. 5).

Let us sketch the process of production of sentence (5b) starting from the semantic representation underlying sentence (5a), given in a verbal, or textual, form (6a) below. (The semantemes intensifying 'money' and 'travel' are omitted from the representation for simplicity's sake; the communicatively dominant semantemes are underlined).

- (6) a. 'John's having<sub>P</sub> money <u>enables</u> him to travel<sub>Q</sub>'
  - b. 'John's having<sub>P</sub> money '<u>causes</u> that he is.able' to travel<sub>Q</sub>'
  - c. 'John's being able to travel<sub>Q</sub> is a consequnce of his having<sub>P</sub> money'
  - d. 'John hasp money; as a consequence, he is able to travelo'

Semantic decomposition of 'enable' (by the expansion/reduction rule in Fig. 4 above applied from left to right) results in the representation in (6b). Then the global substitution rule in Fig. 6 is applied to (6b), yielding (6c). Finally, a communicative reconstruction rule (that will not be shown) is applied to (6c) in order to put 'be.able' in the communicatively dominant position with respect to 'consequence', which get us to (6d). A result of this last rule's application is the inversion of subordination (head switching) happening in the subsequent phases of synthesis (at the deep-syntactic level of representation).

The representation in (6c) can of course be implemented by sentences other than (5b), for example the following ones:

(7) a. John has money; therefore <so, consequently> he can travel.
b. John has money and (therefore) can travel.
c. John has money; he can travel.

To wrap up, let me mention two semantic quasi-equivalences underlying some paraphrases in the corpus that are not causation-related; the first one holds between the sentences in (8) and the second one between those in (9); the relevant fragments of sentences are bolded:

- (8) a. Because of his comfortable income, John can travel a lot.b. John travels a lot thanks to his comfortable income.
- (9) a. Thanks to his remunerative job, John travels often <frequently>.
  b. Travelling has been made easy thanks to John's high salary.

The corresponding quasi-equivalence rules are indicated in Table 7; the second rule hadn't been identified and described before.

(8a) to (8b)	ABILITY ~ HABIT/FREQUENCY	'X is able to do P ' $\cong$ 'X usually/often does P'	$\checkmark$
(9a) to (9b)	HABIT/FREQUENCY ~ EASE	'X usually/often does $P' \cong$ 'doing P is.easy for X'	X

Table 7: Another two semantic quasi-equivalences and the corresponding paraphrasing rules

These quasi-equivalences are not purely linguistic in nature; they exploit some everyday knowledge about the world: in the first case, that being able to do something entails being in the habit of doing this thing, if it turns out beneficial or pleasant for us; in the second, that things we do often and up being easy for us to do. Thus, the paraphrases they allow us to produce are partially pragmatically based.

# **4** Conclusion

As predicted at the outset of the study, most paraphrasing rules applied (unconsciously) by the speakers that produced the paraphrases in our corpus already exist within the Meaning-Text paraphrasing system. More specifically, semantic (quasi-)equivalence rules and semantic-communicative restructuring rules were exploited for global restructuring of the semantic representation underlying the starting sentence; they were often used in conjunction with lexical-syntactic equivalence rules for more local restructuring.

A few paraphrastic links were found that were not accounted for by the existing paraphrasing rules:

- rhetorical additions (*We know that John does well ...*; *How often John travels tells us that ...*);
- «causation ~ corroboration» link, illustrated in (5a)-(5f), also rhetorical in nature;
- «habit ~ frequency/ease» link, as in (9), a semantic equivalence with a hint of pragmatic knowledge.

To find more paraphrastic links not accounted for by Meaning-Text paraphrasing rules, a larger corpus of paraphrases is needed.

Future studies could focus on the description of rhetorical paraphrastic links, like those just mentioned, and pragmatically based paraphrases, such as those illustrated in example (3).

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# References

Féry, Caroline & Ishihara, Shinchiro, eds. 2016. *The Oxford Handbook of Information Structure*. Oxford: Oxford University Press.

Fuchs, Catherine. 1980. Paraphrase et théorie du langage. Contributions à une histoire des théories linguistiques contemporaines et à la construction d'une théorie énonciative de la paraphrase. PhD Thesis. Paris: Université Paris VII.

Marengo, Sébastien, ed. 2021. La Théorie Sens-Texte. Concepts clefs et applications. Paris: L'Harmattan.

- Martinot, Claire. 2009. Reformulations paraphastiques et stades d'acquisition en français langue maternelle. *Ca-hiers de Praxématique*, 52: 29-58.
- Mel'čuk, Igor. 1974. Opyt teorii lingvističeskix modelej Smysl-Tekst. Moscow: Nauka. [Reprinted in 1999, Moscow: Jazyki russkoj kul'tury.]
- Mel'čuk, Igor. 1992. Paraphrase et lexique: la théorie Sens-Texte et le Dictionnaire explicatif et combinatoire. In: Mel'čuk, I. et al., Dictionnaire explicatif et combinatoire du français contemporain. Recherches lexico-sémantiques III. Montréal: Presses de l'Université de Montréal; 9-59.
- Mel'čuk, Igor. 2001. Communicative Organization in Natural Language. Amsterdam/Philadelphia: Benjamins.
- Mel'čuk, Igor. 2013. Semantics. From Meaning to Text, vol 2. Amsterdam/Philadelphia: John Benjamins.
- Mel'čuk, Igor & Polguère, Alain. 2021. Fonctions lexicales dernier cri. In: Marengo, S., ed., 2021; pp. 75-155.
- Milićević, Jasmina. 2007a. La paraphrase. Modélisation de la paraphrase langagière. Berne: Peter Lang.
- Milićević, Jasmina. 2007b. Semantic Equivalence Rules in Meaning-Text Paraphrasing. In: Wanner, L., ed., Selected Lexical and Grammatical Issues in Meaning-Text Theory. In Honor of Igor Mel'čuk. Amsterdam/ Philadelphia: John Benjamins; 267-297.
- Milićević, Jasmina. 2021. Modélisation de la paraphrase linguistique approximative. In: Marengo, S., ed, 2021; pp. 51-74.
- Quirk, Randolph, Greenbaum, Sidney, Leech, Goeffrey & Svartvik, Jan. 1985. A Comprehensive Grammar of the English Language. London: Longman.
- Wanner, Leo, ed. 1996. Lexical Functions in Lexicography and Natural Language Processing. Amsterdam/Philadelphia: John Benjamins.
- Wierzbicka, Anna. 1996. Semantics, Primes and Universals. Oxford/New York: Oxford University Press.
- Wierzbicka, Anna. 2021. Semantic Primitives, Fifty Year Later. Russian Journal of Linguistics, 25/2: 317-342.
- Žolkovskij, Aleksandr & Mel'čuk, Igor. 1967. O semantičeskom sinteze. *Problemy kibernetiki*, 19: 177-238. [French translation: Sur la synthèse sémantique. 1970. *TA Informations*, 2: 1-85.]

## **Appendix: Corpus of Paraphrases**

Below we list all eighty paraphrases of the sentence *John's comfortable income enables him to travel a lot.*<sup>4</sup>

2-CLAUSE REALIZATION P = 'John has money'; Q = 'John can travel' Main fact: the one implemented as the main predication/matrix clause. Completive clauses and nominal relative clauses are considered clause elements (parts of clauses)

A Coordination

John has a good salary and can afford frequent travel. | John must make a ton of money: he goes on vacation all the time. | John makes a lot of money; therefore, he is able to travel frequently. [2]

#### **B** Subordination

B1 Main fact: P

John makes good money, which permits him to take a lot of trips. | John makes a lot of money, which lets him travel often. | John has a high salary, which allows him to travel lots. | John is paid well, which is why he can go on so many vacations. | John receives comfortable wages, which allows him to travel several times a year. | John makes enough money that he can travel a lot. | We know John does well (for himself) because he travels a lot. [7]

<sup>&</sup>lt;sup>4</sup> The paraphrases were produced by eight students of the course FREN 4046 (*Expression écrite*) given at Dalhousie University (Halifax, Canada) in the 2017-2018 academic year.

#### B2 Main fact: Q

John is able to travel a lot because he has a high income. | John has the ability to travel a lot because he makes a comfortable income. | John travels a lot because he has a comfortable income. | John travels a lot because he makes a decent amount of money. | John often goes on trips because he has a very good income. | John goes on a lot of trips because he's well off. | John travels a lot since he has a comfortable income. | John can travel lots, since he makes a comfortable amount of money. | John travels a lot since he has a comfortable income. | John can travel lots, since he makes a comfortable amount of money. | John travels a lot as he receives a comfortable income. | John has been able to travel on numerous occasions, as he makes a decent salary at his job. | John can travel a lot as he has an income that is comfortable for him. | If John didn't make as much as he does, he wouldn't travel as often. [12]

#### **1-CLAUSE REALIZATION**

#### C1 Main fact: causation

John's comfortable returns allow him to travel often. | His comfortable income allows John to travel often. | John's earnings allow him to travel a lot. | John's comfortable income allows him to take lots of excursions. | John's adequate income allows him to do many trips per year. | John's untroubled economic status permits him the luxury of travelling often. | John's livelihood grants him the freedom to take trips regularly. | The wages  $\rightarrow$  pay [John experiences  $\rightarrow$  receives, earns, is paid give him a lot of travel opportunity. | John's frequent vacations have been enabled by his comfortable salary. | John's ability to travel a lot is made possible by his comfortable income. | John's vacations have been made possible due to the amount of money he makes at his job. | Travelling has been made easy thanks to John's

prosperous  $\rightarrow$  generous, high salary. | Being able to travel a lot is a result of John's good salary. | It is John's comfortable income that supports his travel habits. [13]

#### C2 Main fact: P

John earns enough money to afford to travel often. | John makes enough money to allow him to take frequent vacations. | John makes enough money to be able to travel a lot. | John's revenue  $\rightarrow$  income, earnings is/are such that he can travel often without economic  $\rightarrow$  financial pressure. | The money [that John makes] is sufficient to pay for all the trips he takes. | The income [that John makes] is comfortable enough to allow him to travel a lot. | [How often John travels] tells us he makes a good living. | The reason why John is able to take so many trips a year is his great revenue. [8]

#### C3 Main fact: Q

John, enabled by a comfortable income, travels a lot. | John is able to travel often because of his comfortable income. | John is able to travel several times during the year because of his comfortable wages. | John can travel often because of his earnings. | John can take many trips thanks to his high-paying job. | John can go on many vacations thanks to his comfortable income. | John gets to travel a lot thanks to his comfortable salary. | John often gets to travel thanks to his income. | John gets to travel frequently, thanks to his high-paying job. | John travels a lot, thanks to his comfortable income. | John travels frequently thanks to his comfortable salary. | John second travels income, he can travel a lot. | Thanks to his comfortable income, he is able to travel often. | Thanks to his comfortable income, John travels often. | Thanks to his comfortable income, he is able to travel a lot. | Due to the fact that John has a nice income, he goes on many trips. | Due to a generous salary, John travels often. | Because of his comfortable income, John can travel a lot. | Because of his comfortable income, John can travel a lot. | Because John has a job that earns him a prosperous income  $\rightarrow$  a lot of money,

he can travel frequently. | Because John earns a good-sized  $\rightarrow$  good, high salary, he has been able to visit many places. | Because of his good salary, John can travel often. | As a result of his high earnings, John gets to see the world. | It is because John has a comfortable income that he can travel as much as he does. | Earning quite a bit of money, John travels often. | Making enough money, John travels a lot. | Making a comfortable amount of money at work, John can travel several times during the year. | Receiving a high income, John can travel a lot. | Having a comfortable income, John is able to travel a lot. | Having a considerable amount of cash, John can travel a lot. | With a comfortable income, John goes travelling quite a bit. | With the money John makes, he is able to travel a lot. | Without John's income, he would never be able to afford his numerous trips. | Without the adequate funds that John has thanks to his job, he would not be able to take as many trips. | Travelling is something John can afford to do due to his substantial salary. | John's frequency of travel is correlated to his high remuneration. [37]