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**A TOOL TO EVALUATE GRAMMATICAL SPELLING SKILLS OF NATIVE FRENCH ADULTS:
A TYPOLOGY BASED ON THE CAUSES OF ERRORS**

FRENCH GRAMMATICAL SPELLING

French language has a variety of derivational and inflexional morphemes that makes its morphology very rich (Catach, 1986). French morphology is not written as it is pronounced (Jaffré, Fayol, 2014). Adding up to that difficulty for its scriptors, most of the inflexional morphology in particular is silent (Dubois, 1965).

Ex. the ADJECTIVE «bare»: *nu (masculin) - nue (feminin)* : both pronounced [ny]
This orthographic depth mainly explains why we find most of spelling errors in that particular area of written French (Fayol, Jaffré, 2008; Lucci, Millet, 1994).

Among the variety of forms that French inflexional morphology can display, our study case focuses on a particular linguistic skill that is how one transfers plural and gender traits from the word that triggers the agreement to the one that receives it. In other words we will specifically evaluate grammatical spelling skills (Gauvin, 2011).

Ex. *La marée haute est montée (the high tide has risen)*
The NOUN «marée» gives singular and feminine traits to the ADJECTIVE «haute» and the PAST PARTICIPLE «montée» and the 3rd person singular trait to the AUXILIARY «est».

WHY WOULD ONE MAKE AN AGREEMENT ERROR?

Various causes, sometimes several at the same time, may lead to a mistake in the transfer of agreement traits. Some of them are covered by our evaluation tool:

- declarative knowledge (Anderson, 1983) is deficient: metalanguage is not properly learnt and/or grammatical analysis is not precise enough to understand the rule nor trigger its application.
- declarative knowledge is acquired but revision skills are not thorough enough, leading one to leave a mistake while one knows the rule and how to apply it (Largy, 2001; Dédéyan & al., 2006).
- cognitive resources management lead to a mistake: an automatic procedure is triggered to avoid working memory overload in multitasking instead of applying the rule (Fayol, Got, 1991; Fayol, Largy 1992; Fayol, Pacton, 2005)

HYPOTHESES

- 1.A. It is possible for a student to be able to make correct agreements without knowing the agreement rule (Gaux, Gombert, 1999): procedural > declarative knowledge
1.B. The opposite is possible as well: a student may know the rule, but still make mistakes when he or she writes (*ibid.*): declarative < procedural knowledge
2. A typology based on the causes of errors might reveal a scale of expertise more obviously than a typology based on grammatical categories.

COMPOSITION OF THE EVALUATION

6 agreement receivers are tested: NOUN, ADJECTIVE, VERB, PAST PARTICIPLE - ADVERB and INFINITIVE VERB (inhibited agreement).

Each in various configurations:

- distance between the word that gives and the one that receives the agreement traits,
 - inversion of the typical order (the receiver is placed before the word that triggers the agreement),
 - existence of an homophonic word of a different grammatical category
 - presence of a candidate to trigger the agreement in the proximity zone.
- Leading to 43 linguistic configurations = 43 sentences

The evaluation tool is built on 5 exercises:
1. Sentence writing task (Largy, Fayol, Lemaire, 1996) = translating right after the planification process (Flower, Hayes, 1981)
2. Secondary task paradigm (Fayol, Got, 1991; Largy, Fayol, Lemaire, 1996) = multitasking to load the working memory
3. Revision task
4. Mistake reproduction task (Gaux, Gombert, 1999) : if one can replicate a mistake, one understands the rule
5. Grammatical analysis and use of metalanguage
The instructions of each exercise are here described:

1. SENTENCE WRITING TASK

The student has to recall an entire sentence dictated once. The aim claims to assess their memory, not their spelling skills.

Ex. *Ses parents pensent que certaines de ses fréquentations sont bizarres.*
[NOUN - plural] [ADJ - plural]

His parents think some of his *friends* are *weird*.

2. SECONDARY TASK PARADIGM

The subject has to recall a sentence + a list of 3 phonologically confusable monosyllabic words.

Ex. *Ces marchands ne me semblent pas dignes de confiance.*
[NOUN - plural] [ADJ - plural]
Those sellers don't seem trustworthy to me.

BULLE - MULE - PULL
/byl/ - /myl/ - /pyl/

3. REVISION TASK

Reading the same sentences he had to write in prior tasks, the student has to detect an agreement mistake. The instructions do not specify whether there was a mistake or not in the presented sentence nor how many there could be.

Ex. *Ces marchands ne me semblent pas digne de confiance.*

4. MISTAKE REPRODUCTION TASK

The student reads two different sentences. In the first one lays an agreement mistake, while the second one is correct. The student is asked to reproduce the mistake of the first sentence in the second sentence.

Ex.
1. *Ces marchands ne me semblent pas digne de confiance.*
2. *Ses parents pensent que certaines de ses fréquentations sont bizarres.*
--> *bizarre.*

5. GRAMMATICAL ANALYSIS

This exercise is divided into two parts. In the first one, the student is asked to draw a line to connect a specific word with the one that triggers its agreement. In the second part, the metalinguistic knowledge is tested as the subject has to write the name of given labels such as «noun», «verb», «direct object» etc... under the corresponding words in a list of sentences. The labels are those that appear when they learn French agreement rules.

Ex. ADJECTIVE - NOUN
Ces marchands ne me semblent pas dignes de confiance.

COMBINATION OF RESULTS = DIAGNOSIS

We add up the results to each sentence of each task for each student. The combination of the results leads to a broad diagnostic as follows :

- No error in both production tasks
- Agreement is correct in the production task, but an error occurred in one of the other exercises
- Error in the production task
The error is detected in the revision task
- Error in the production task
The error is not detected in the revision task
Declarative knowledge OK
- Error in the production task
The error is not detected in the revision task
Deficiency in the declarative knowledge
- Working memory overload

STUDY CASE

Population:

2 classes of 20 students each, all of them were picked out by their teacher because of their various difficulties in French spelling and writing in general.

GROUP 1: 1st year of Bachelor degree in Modern French Literature (18-21 year old). Students' background = graduated High School.

GROUP 2: 1st year of Bachelor degree in Agronomic Engineering (20-22 year old). Students' background = 2 years in Preparatory Class (in Chemistry, Biology or Mathematics)

AGREEMENT RECEIVER	STUDENTS
NOUN	[Heatmap grid]
ADJECTIVE	[Heatmap grid]
VERB	[Heatmap grid]
PAST PARTICIPLE	[Heatmap grid]
ADVERB	[Heatmap grid]
INFINITIVE VERB	[Heatmap grid]

AGREEMENT RECEIVER	STUDENTS
NOUN	[Heatmap grid]
ADJECTIVE	[Heatmap grid]
VERB	[Heatmap grid]
PAST PARTICIPLE	[Heatmap grid]
ADVERB	[Heatmap grid]
INFINITIVE VERB	[Heatmap grid]

STUDENTS
[Error structure heatmap grid]

STUDENTS
[Error structure heatmap grid]

TABLE 1 - Students' evaluation according to the grammatical category of the agreement receiver

TABLE 2 - Students' evaluations according to the type of errors

RESULTS AND DISCUSSION

In each little square, the letter refers to a code that specifies the cause of the error, based on the combination of the results of all 5 exercises. Vertically, the table is sorted according to a linguistic typology (i.e. according to the grammatical category of the agreement receiver: NOUN, ADJECTIVE, VERB, PAST PARTICIPLE, ADVERB AND INFINITIVE VERB).

This «map» may confer a general impression of scattered skills from one student to the other, which reflects how a teacher may feel towards any class, as all classes are generally very heterogeneous, even among the same curriculum.

In dark green squares, the letters a, b and c correspond to correct agreements in both production tasks for a specific linguistic structure associated with incorrect declarative knowledge. In other words, the student knows how to make the agreement properly but is not able to explain the rule nor make a correct grammatical analysis using the proper metalanguage.

	GROUP 1 (number of occurrence)	GROUP 2 (number of occurrence)
a & b = production OK but doesn't know or understand the rule	154	189
c = production OK but grammatical analysis is incorrect	98	108

Hypothesis 1.A. «It is possible for a student to be able to make correct agreements without knowing the agreement rule (Gaux, Gombert, 1999)» is validated.

In yellow squares, the letters k and l reveal cases where the production is incorrect but declarative knowledge is learnt properly.

	GROUP 1 (number of occurrence)	GROUP 2 (number of occurrence)
k & l = production is incorrect but declarative knowledge is learnt	387	324

Hypothesis 1.B. «The opposite is possible as well: a student may know how to explain the rule, but still make mistakes when he or she writes (*ibid.*)» is validated.

RESULTS AND DISCUSSION

In each little square, the number represents a specific structure of agreement so that the student and the teacher can spot specifically the linguistic context where the error occurred. Vertically, this table is sorted according to the cause of errors that each student makes for each linguistic structure.

Scale of expertise

In terms of remediation, if we consider that teaching declarative knowledge needs more resources than enhancing revision skills for example, a scale of expertise may be established according to the «depth» of deficiencies. That scale is very visible with TABLE 2.

If we compare TABLE 1 on the left with TABLE 2 above, it appears that it is easier to assess the skills of a class if we use a typology based on the causes of the errors rather than the grammatical categories. We might then want to reconsider how sequences are built in remediation; it probably has to differ from how the same skills are acquire at school, one rule after another.

Hypothesis 2 «A typology based on the causes of errors might reveal a scale of expertise more obviously than a typology based on grammatical categories» is validated but still needs to be discussed as it requires class interventions using a typology based on the causes of errors to assess the efficiency of such a scale of expertise.

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