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ARABIC PSYCHOLOGICAL VERBS RECOGNITION THROUGH NOOJ TRANSFORMATIONAL GRAMMARS

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Outline

1) Introduction
2) Related work
3) Overview of the Arabic psychological verbs
4) Transformational Grammars : Theoretical study
5) Implementation
6) Conclusion and Perspectives

Introduction

- The psychological verbs are widely used in:
  - *Newspapers texts*
  - *Novels*
  - *Social networks messages,…*
- The syntactic-semantic analysis of those verbs is important for :
  - *Sentiment analysis*
  - *Question answering systems*
  - …

Introduction

- The basic task of the analysis is to know people's concerns, their feelings, their tendencies, their opinions …

Useful for decision-making

Introduction

Main objective :

Know the opinion of Moroccan youth regarding their daily interest and concerns.

Create linguistic resources

Related work

- (Amzali et al., 2020)

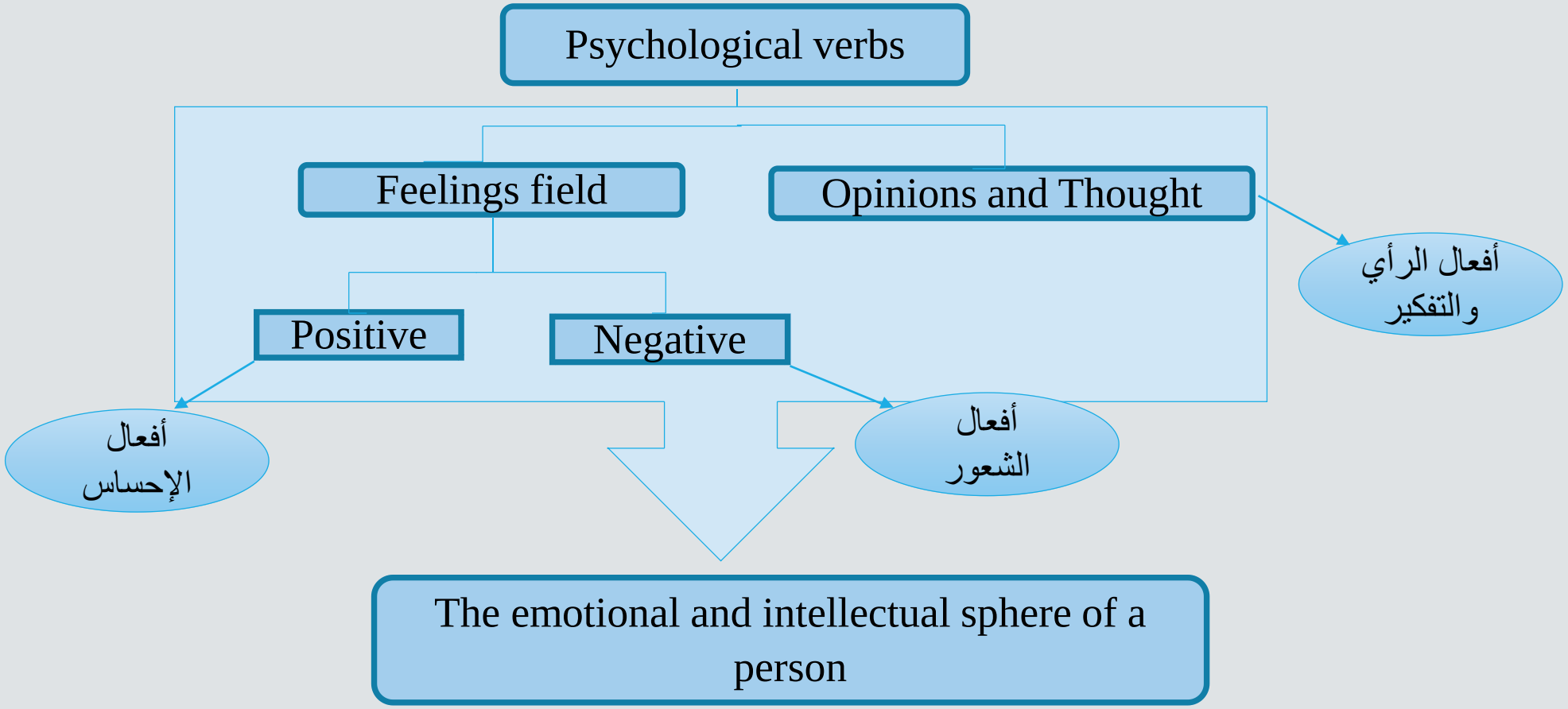
Maked a linguistic study for Arabic psychological verbs and classifed them using Lexicon-Grammar approach.

- (El Hannach, 1999, 2013)
  - *Proposed a syntactic analysis of Arabic qualitative verbs (Structure VN0'anJl), and studied their transformations.*
  - *Studied the transformations that could be applied in the Arabic language.*
- (Silberztein, 2019)

Created a transformational grammar which allows the recognition all the transformational forms of the French sentence «Emma aime Gabriel».

Overview of the Arabic psychological verbs

- Describe the change in the emotional and psychological states of a human being.



Transformational Grammars : Theoretical study

- Describe the relations between the different structures of the sentence.

- Those structures share :
  - ✓ *The same lexical material*
  - ✓ *Meaning invariant*

Transformational Grammars : Theoretical study

There are many transformational forms such as:

- ✓ ***Negation***
- ✓ ***Nominalization***
- ✓ ***Passivation***
- ✓ *Restructuration*
- ✓ *Adjectivation ,…*

Transformational Grammars : Theoretical study

■ The negation (النفي)

This transformation is based on the logical operator of negation, such as:”laa” (لا - No); ”lan”(لن - Not), etc…. . The negative statement would have true value opposite to the corresponding affirmative statement, e.g :

a) (Luc adores Marie) يَعْشَق لوك ماري ⟶ لا يَعْشَقُ لوك ماري(Luc doesn’t adore Marie).

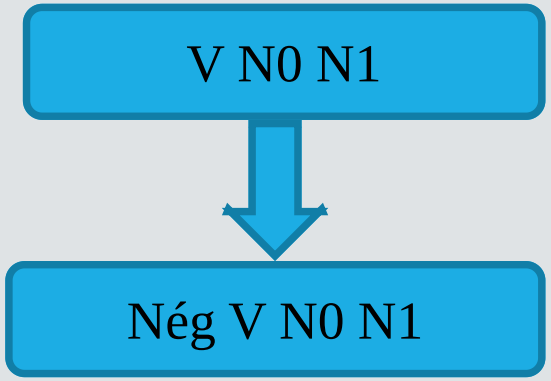
b) (Luc will adore Marie) سَيَعْشَقَ لوك ماري ⟶ لن يَعْشَقَ لوك ماري(Luc won’t adore Marie).

N1 NO V —Negation→ N1 NO V Nég

Transformational Grammars : Theoretical study

- **The negation (النفي)**

The structure of negation:



Transformational Grammars : Theoretical study

- **The passivation (المبنى للمجهول)**

✓ The Arabic and French passivation syntax generally correspond to the same deep structure. The passive verb can be translated by a flexion form .

✓ The majority of psychological verbs have a passive form with the agent complement deleted, e.g:

(Luc adored Marie) عَشِق لوك ماري ⟶ عُشِقَتْ ماري(Marie is adored).

N1 N0 V —Passivation→ N1 Vpp

(Luc adored Marie) عَشِق لوك ماري ⟶ عُشِقَتْ ماري من طرف لوك (Mary was adored by Luc).

N1 N0 V —Passivation→ N0 Taraf Min N1 Vpp

Transformational Grammars : Theoretical study

- **The passivation (المبنى للمجهول)**

The structure of passivation:

Transformational Grammars : Theoretical study

- **The nominalization (maçdarisation - تكوين جملة اسمية من جملة فعلية)**

This property is considered as a transformational relation between sentences. It allows the transformation of a sentence with a verbal predicate into another sentence with a nominal predicate. It is based on support verbs such as (عبّر - To express) or the support preposition like (لدى - have) e.g:

(Zaid loved Marie) أحبّ زيد ماري → Nominalization → عبّر زيدٌ عَن حبه لماري(Zaid expresses his love to Marie)

N1 N0 V → N1 li Vn Aan N0 Vsup

(Zaid loved Marie) أحبّ زيد ماري → Nominalization → أكنّ زيدٌ حبًّا لماري(Zaid keeps love to Marie)

N1 N0 V → N1 li Vn N0 Vsup

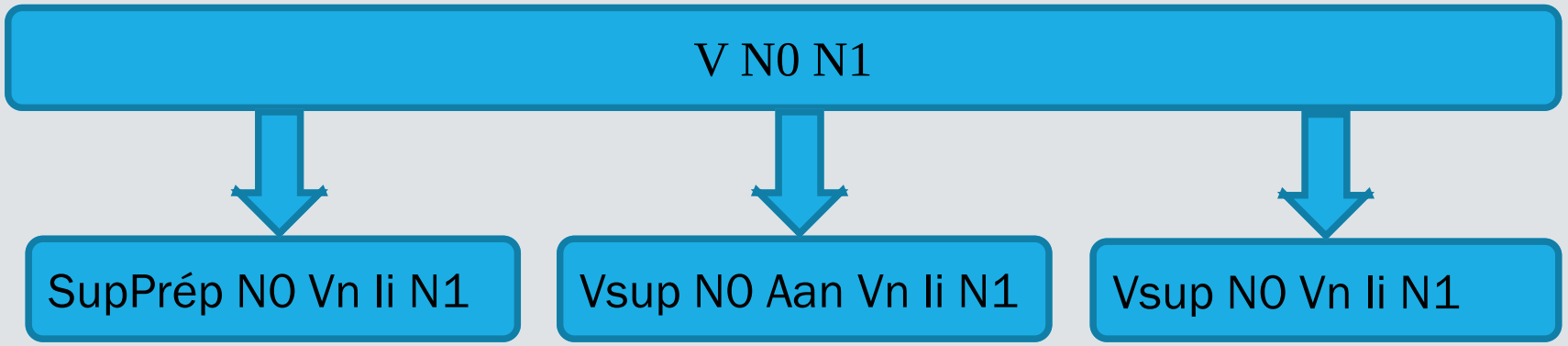
(Luc adored Marie)عَشِق لوك ماري → Nominalization → لدى لوك عِشْقٌ لِماري (Luc has a passion for Marie).

N1 N0 V → N1 li Vn N0 SupPrép

Transformational Grammars : Theoretical study

- **The nominalization (maçdarisation - تكوين جملة اسمية من جملة فعلية)**

The structure of nominalization:



Transformational Grammars : Theoretical study

Category	V	Tr	InTr	NO=Hum	N1=Hum	N1=Nhum	N1=Nnr	Prép1=في	Prép1=من	Prép1=على	Prép1=ب	Prép1=إلى	Prép1=ل	Nég=لا	Nég=ما	Nég=لن	Vsup=أكّ	Vsup=ملأ	Vsup=أبان	Vsup=عبّر	Vsup=أعرب	SuPPrép=لدى	SuPPrép=عند	VNOPrép1N1	VNON1	VNO	<OPT>example	<OPT>explication	Vpp N1	VppPrép1N1	Vpp N1 min tarafi NO	NégVNO	NégVN0N1	NégVNOPrép1N1	Vsup NO aan Vn li N1W	Vsup NO Vn li N1W	SuPPrép NO Vn li N1W
أفعال الإحساس	بَجِحَ	-	+	+	+	-	+	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	+	+	-	بَجِحَ بالشَّيء	عَظَّمَه و فَرِحَ بِهِ و فَخِرَ	+	+	-	-	+	+	+	-	+
	بَجَّحَ	+	-	+	+	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	+	+	-	+	-	بَجَّحَهُ الخَبَر	أفرح	+	-	+	-	+	-	~	~	~
	أَبْجَحَ	+	-	+	-	+	+	-	-	-	-	-	-	+	+	+	-	-	-	-	+	-	-	+	-	أَبْجَحَه الشَّيء	أفرح	+	-	+	-	-	-	~	~	~
	بَجِلَ	-	+	+	+	-	+	-	-	-	-	-	-	+	+	+	+	-	-	-	+	-	-	-	+	بَجِلَ أحْمَد بالخَبَر	بَجِلَ:فرح	+	+	+	+	-	+	~	~	~
	حَنَّ	-	+	+	+	+	+	+	-	-	+	-	-	-	+	+	+	-	-	-	+	+	-	+	-	حنَّ الدَّمُ على الدَّم	حَنَّ عليه:عَطَفَ	+	~	+	-	+	+	+	-	+
	أَحَبَّ	+	-	+	+	+	+	-	-	-	-	-	-	+	+	+	+	-	-	-	+	+	-	+	-	أَحَبَّ أحْمَد مَرْيَم.	أَحَبَّ:وَدَّه و مال إليه.	+	-	+	-	+	+	+	+	+
	أَبْجَلَ	+	-	+	+	+	+	-	-	-	-	-	-	-	+	+	-	~	~	~	+	~	~	-	+	أَبْجَلَ الشَّيء	فرح به	+	-	+	-	+	-	~	~	~
	عَشِق	+	-	+	+	+	+	-	-	-	-	-	-	-	+	+	+	-	-	-	+	-	+	-	+	عَشِق لوك ماري	عَشِق:أَحَبَّ	+	-	-	+	+	-	+	+	+

Table1: Excerpt of our lexicon-grammar table

Implementation in NooJ

- NooJ dictionary

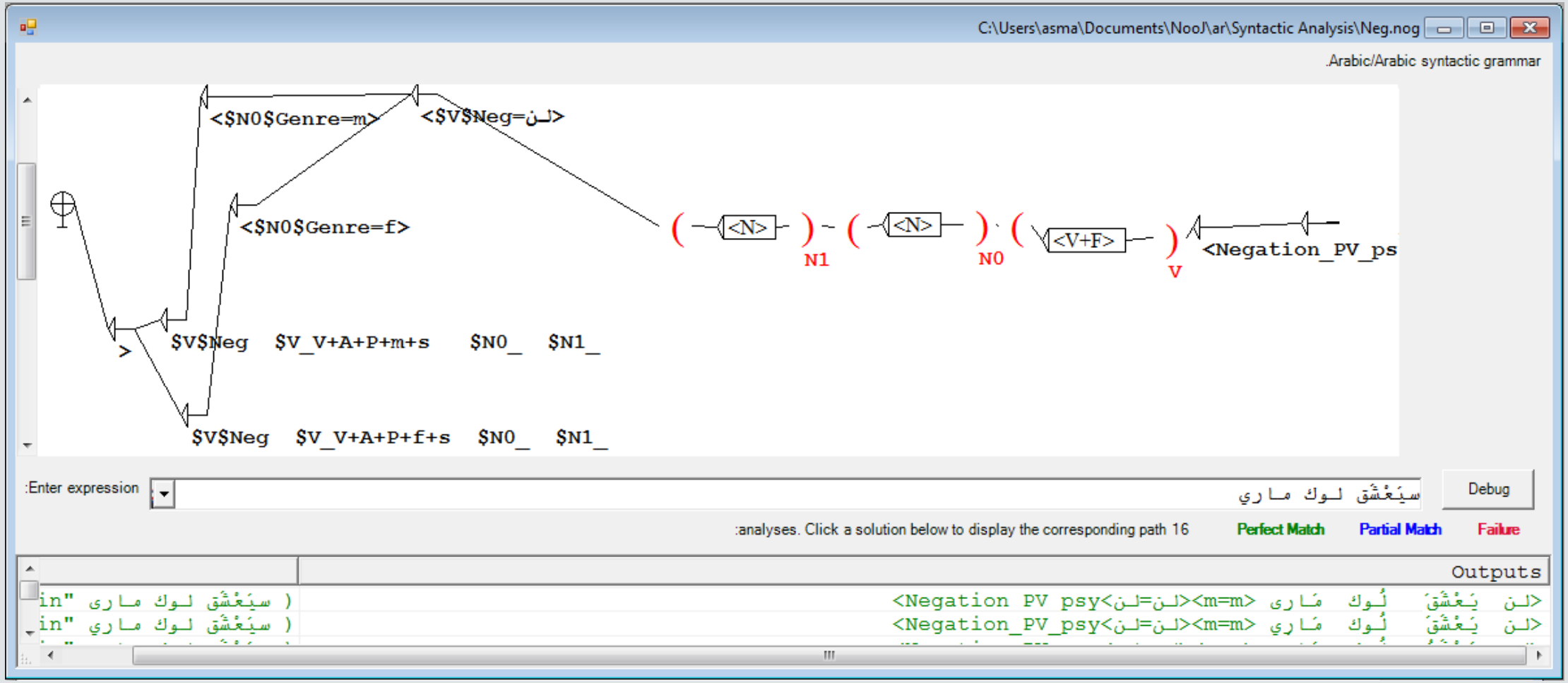
C:\Users\asma\Documents\NooJ\ar\Lexical Analysis\PS_2.dic

Dictionary contains 332 entries

```
# NooJ V5
# Dictionary
#
# Language is: ar
#
# Alphabetical order is not required.
#
# Use inflectional & derivational paradigms' description files (.nof), e.g.:
# Special Command: #use paradigms.nof
#
# Special Features: +NW (non-word) +FXC (frozen expression component) +UNAMB (unambiguous lexical ent
#                   +FLX= (inflectional paradigm) +DRV= (derivational paradigm)
#
# Special Characters: '\' '"' ' ' ',' '+' '-' '#'
#use qualitatif.nof
#use ex2.nof
بَـجِجَ,V+InTr+N0=Hum+N1=Hum+N1=Nhum+Prép1=ب+Vsup=عبّر+SupPrep=لـدى+SupPrep=عند+Neg=مـا+VN0Prép1N1+VppPrép1N
بَـجَّجَ,V+N0=Hum+N1=Hum+N1=Nhum+VN0N1+VppN1MinTarafiN0+NégVN0Prép1N1+SuPPrépN0VnliN1W+Neg=مـا+Neg=لـن+SupPr
أَحَبَّ,V+InTr+N0=Hum+N1=Hum+N1=Nhum+VN0N1+VN0Prep1N1+VppN1+VppN1MinTarafiN0+SuPPrepN0VnliN1W+VsupN0VnliN
عَشِقَ,V+Tr+N0=Hum+N1=Hum+N1=Nhum+VN0N1+VppN1+VppN1MinTarafiN0+NegVN0N1+SuPPrepN0VnliN1W+VsupN0VnliN1W+V
حَنَّ,V+N0=Hum+N0=Nhum+N1=Hum+N1=Nhum+Prép1=على+VN0N1+VN0Prép1N1+Vsup=عبّر+SupPrep=لـدى++FLX=V_habba+DRV=D
```

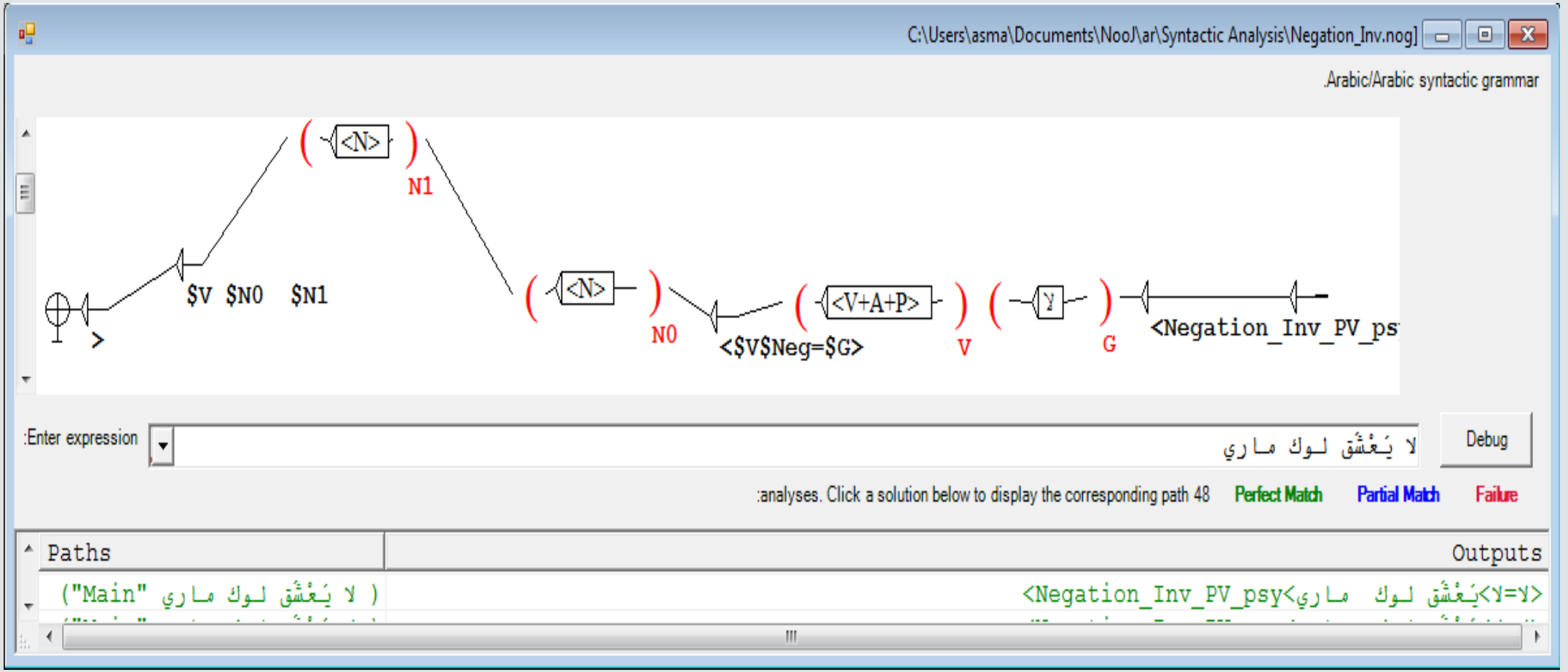
Implementation in NooJ

- Excerpt of the negation transformational grammar



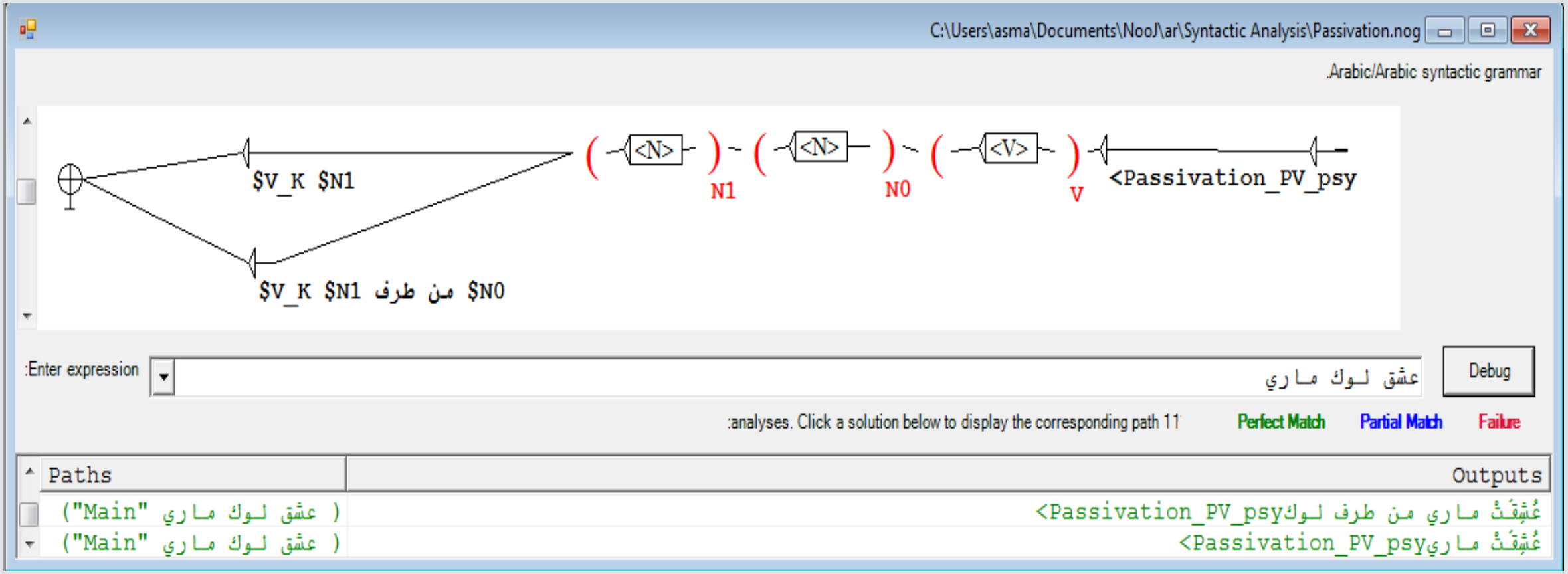
Implementation in NooJ

- Excerpt of the reverse negation transformational grammar



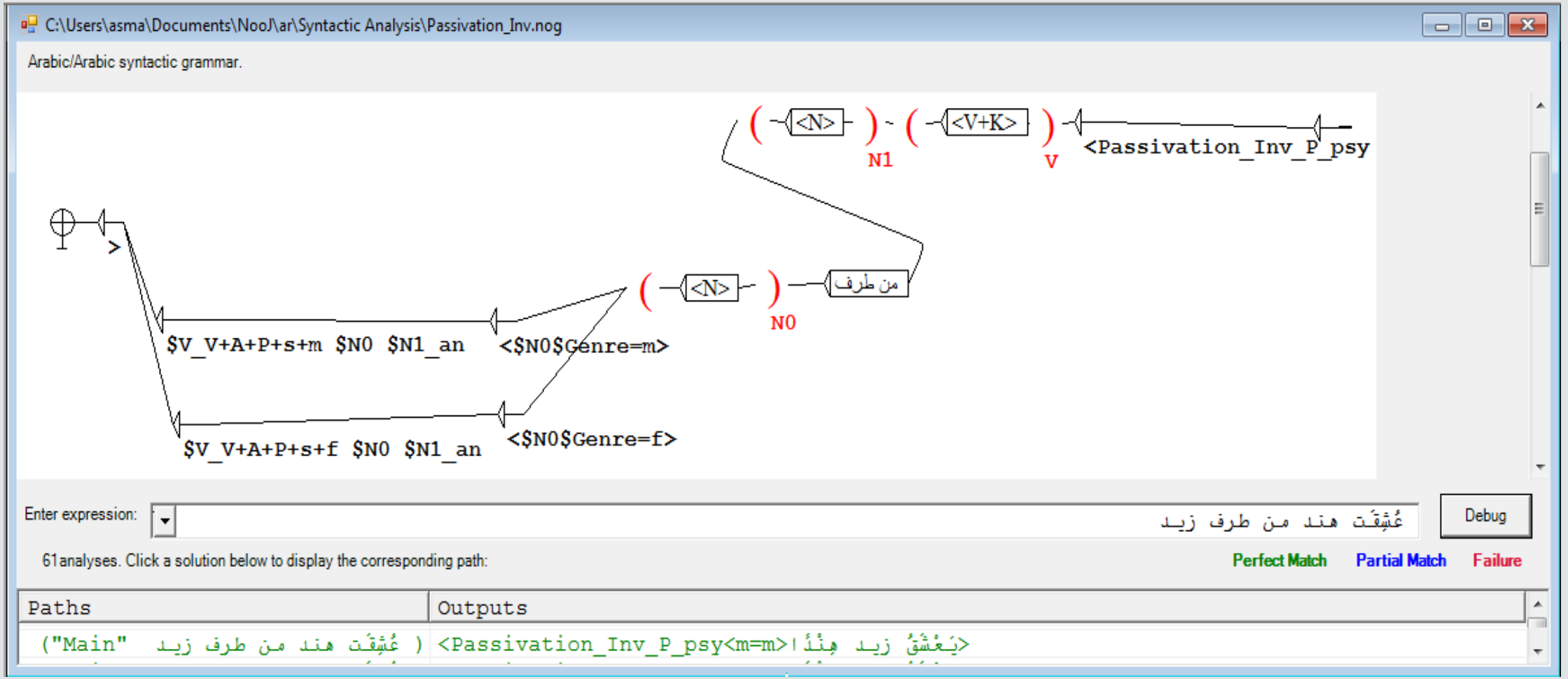
Implementation in NooJ

- Excerpt of the passivation transformational grammar



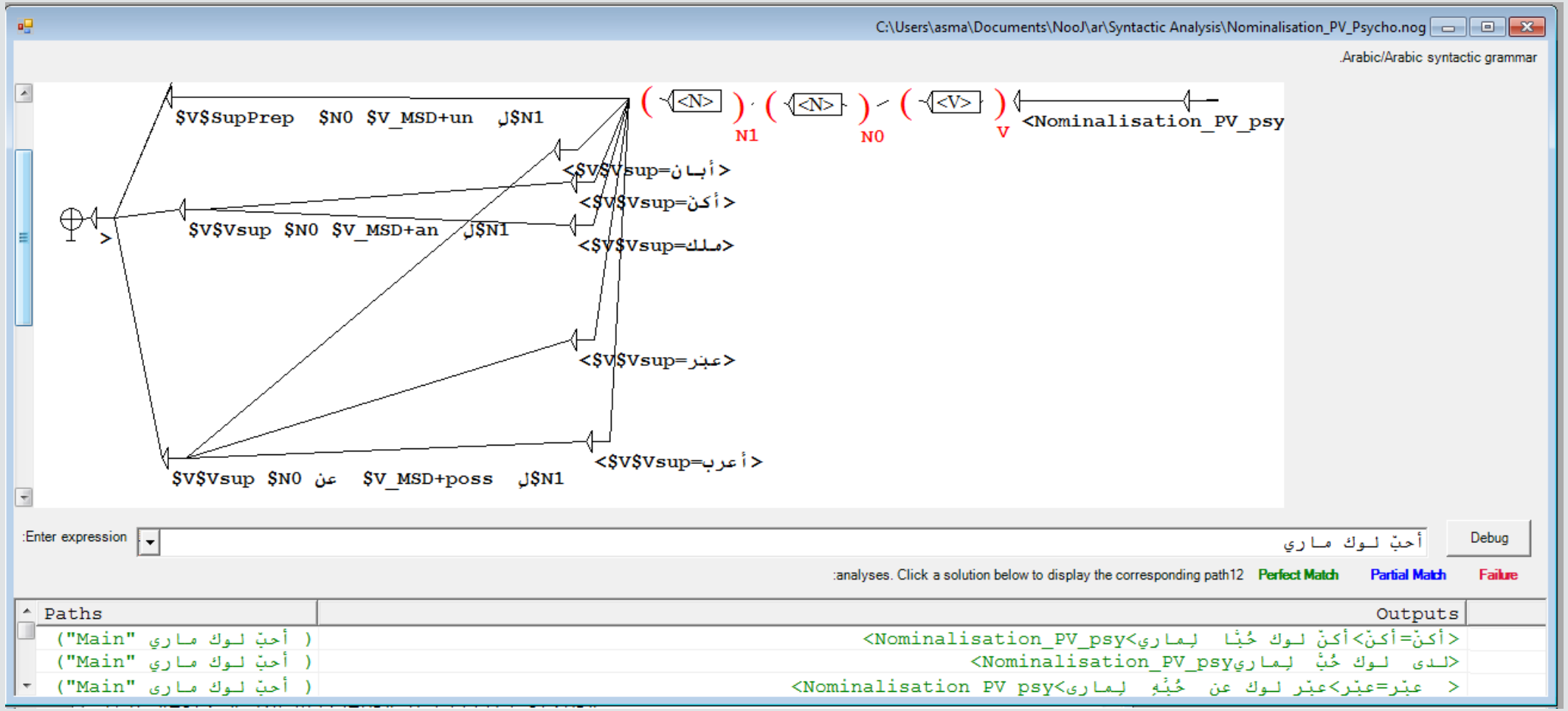
Implementation in NooJ

- Excerpt of the reverse passivation transformational grammar



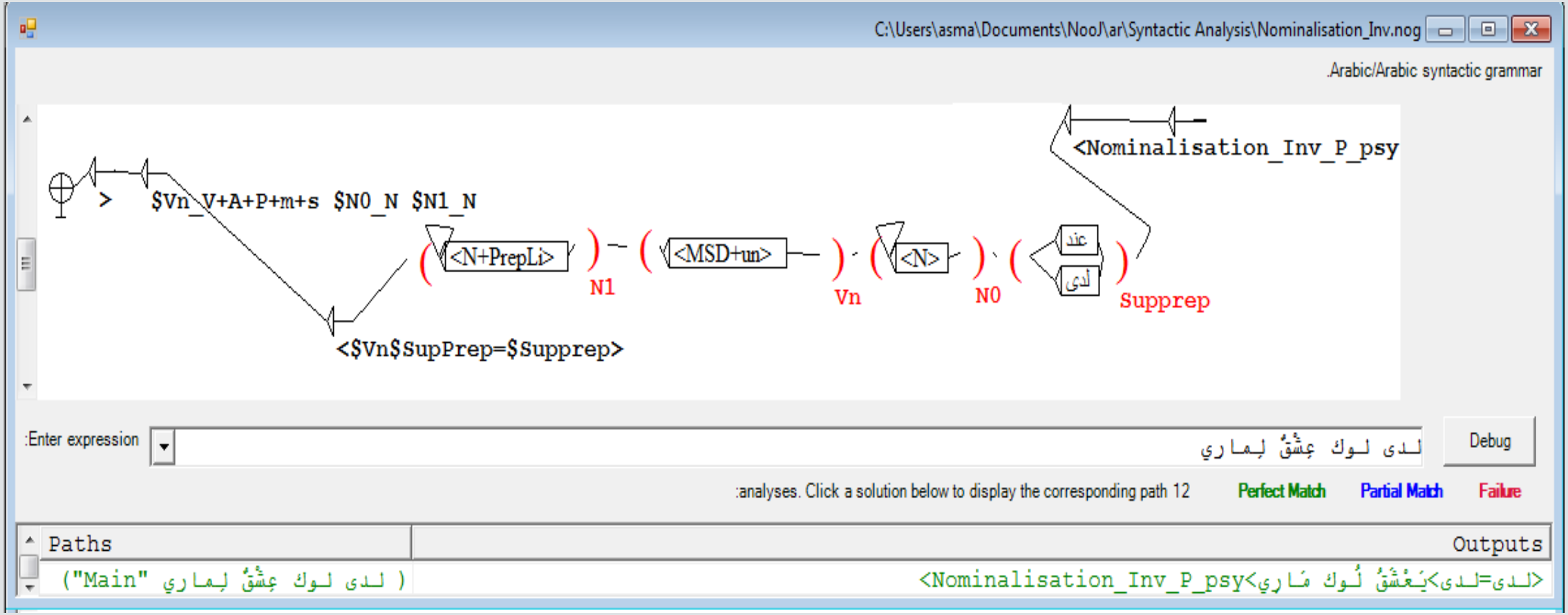
Implementation in NooJ

- Excerpt of the nominalization transformational grammar



Implementation in NooJ

- Excerpt of the reverse nominalization transformational grammar



Conclusion

- In this work, we studied the transformation that could be applied on psychological verbs sentences and implemented them in NooJ platform.
- This study allows recognizing psychological verbs in their basic or transformational form.
- Will have a positive effect on the efficiency of texts and corpora analysis.

Perspectives

- Extend this linguistic study to cover all transformations.
  - *Recognize all the sentences containing psychological verbs in text and corpora.*
- Realize **an application of surveying the opinion of Moroccan youth.**

Thank you for your attention!

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