The intonation-syntax interface in regulating the turn taking system of Tunsian Arabic conversations

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Abstract: This article inspects the role of syntax as a perceptual cue that arranges the turn taking system of Tunisian Arabic (TA) conversations. It relies on my previous research on intonation (Hami, 2017) [1] to look for the interface between intonation and syntax as organisers of dialogues and speaker change. The study is based on exposing native speakers of TA to isolated and contextualised speech, and asking them to judge the turn type, a probable speaker change, and the signal(s) employed for their judgements. Results show that Turn Leave was depicted (a) at the end of the first part of an adjacency pair in the case of yes/no or wh- questions, (b) when the major functional categories of the sentence are met (c) when the sub-categorisation frame of the verb is fulfilled (d) when the turn is a short answer with ellipsis (e) and when a current speaker is interrupted. Turn Hold was indicated in case (a) the sub-categorisation of the verb is not satisfied (b) after completions tailed by new starts by the same speaker (c) and after interruptions, where the speaker maintained the floor by recoverable phrases. As for Turn Take, it took place (a) starting the second part of an adjacency pair, (b) interrupting a previous speaker before a syntactic completion point (SCP) or during a filled pause (c) and using a coordinating conjunction to begin the floor. The cue of syntax was used only when there is a SCP. It plays a moderate to low role in arranging turn taking in TA, as the nominal correlation phi did not exceed 0.5. The cue of intonation proved to be more important than the one of syntax, whether with or without a syntactic completion point. The group of teachers was the group with the most considerable significant values.
Keywords: Turn taking, syntax, intonation, speaker change, Tunisian Arabic.

I.   THEORETICAL BACKGROUND

Conversational analysis (commonly abbreviated as CA) is the study of the social organisation of conversation, or talk in interaction by an exhaustive examination of recordings and transcriptions made from such recordings (Have, 2007) [2]. Its emphasis is not upon constructing structural models but on the close inspection of the participants' behavior in conversation, and on the models which reoccur over an extensive range of natural speech (McCarthy, 1991) [3]. CA starts with the view that 'context' is both planned and produced by the actions of participants. Empirically, this means that the speakers build the context of their conversation in and during their conversation.

One of the basic components of conversation is the exchange of ideas between interlocutors, with amazingly little overlapping, and few silences. According Schegeloff and Sacks (1973) [4], there is an implicit rule in American English which states that no less and no more than one party can talk at a time. This is not an experimental fact, because there are certainly many cases of silences and overlaps, but it is a basic feature of conversation. If ever an overlap occurs, the participants tend to remedy the situation, and return to the situation of one speaker at a time. In the case of silence, a speaker or more will begin speaking, or indicate his intention to speak by making noises such as 'err' or 'mm'.

In fact, a conversation is composed of units which are known to be as either unfinished or probably finished. Next speakers may start once a current speaker has achieved a potential completion. The ability to speak the moment a current speaker has reached a possible completion necessitates high skills on the part of participants. Indeed, they have to be able to both examine and grasp a current sentence so as to know when it is probably complete, and besides to turn out instantaneously a relevant next utterance. This fact may explain the low incidence of overlaps and pauses. Jefferson (1973) cited in Coulthard (1977) [5] argues that the hearer of an ongoing utterance 'has the technical capacity to select a precise spot to start his own talk no later than the exact appropriate moment' (p. 55). Therefore, the interaction management is a shared attempt between the interlocutors to constantly scrutinize different features of each others' behavior for the purpose of deciding about turn taking.

Definitions of turn taking can be assembled in two main groups: mechanical and interactional (Edelsky, 1981) [6]. The first group regards turns as units of talk in interaction, regardless of the social context where they

occur. This group comprises the studies of Jaffe and Feldstein (1970) [7], Duncan and Fiske (1985) [8]. For them, the turn is simply talk followed by a termination. A turn is given to only one speaker and it is identified in terms of the response of the other participants in the conversation. In other words, a turn finishes when a participant other than the speaker takes the floor. Goffman (1981) [9] believes that a turn is the occasion to take the floor, not automatically what is uttered while taking it.

Alternatively, interactional definitions deal with the events that occur during the conversation, and take into account the intension of the turn taker. Edelsky (1981) [6] suggests that speakers are more concerned with finishing the issues of the conversation than with structural units. Consequently, she defines turns as examples of 'on-record speaking' with the intension of communicating some meaning. In addition, she makes a distinction between 'turn' and 'floor', because she believes that it is generally complicated to decide who has the floor. In fact, she asserts that turns are collaboratively constructed by more than one participant. Hence, she defines 'floor taking' as the activity that is happening or the theme being conversed frequently in collaboration.

Ruiter, Mitterer, and Enfield (2006) [10] define turn taking as the participant's attempt to take the floor without interruption, to hold it, or to pass it to another participant. This challenge can be achieved through the use of key signals such as gestures, semantic cues, syntactic cues, prosodic cues, etc. For example, the use of gaze direction, reference words, syntactic completion points, intonation, speaking rate, pauses, all can be cues to turn management. Beňuš, Gravano, and Hirschberg (2011) [11] add the pragmatic component to the definition of turn taking, by describing it as 'a cognitive, dynamically evolving pragmatic system that is fundamental for human interaction' (p. 3001). They insert that the system is primarily 'cross modal': it is all-encompassing both speech and sign language and is strongly associated with the paralinguistic features including gaze and gesture.

Sacks, Schegloff, and Jefferson's (1974) [12] have built up a theory of turn taking, summarised in a review entitled "A simplest systematics for the organisation of turn taking for conversation". They conceptualise turn taking as arranged on an ordered, turn-by-turn foundation, functioning internationally through collective sequential applications. Turn taking has been portrayed as an economy to organise and assign a turn-at- talk or to control the floor. The model is intended as a standard one for any conversation, including any number of partakers who provide alternations in the identities of the parties, and in the context of the conversation. According to Sacks et. al. (1974) [12], turn taking is a 'speech-exchange system' being one of the fundamental organisers of conversation. It is based on the distribution of talk and silences among the participants in a smooth and synchronised way.

The arrangement of turns, though appearing at times chaotic, is highly systematised thanks to diverse mechanisms. In fact, the organisation rests on the power that a current speaker can exercise over the subsequent turn. Three turn-allocation techniques organise the transfer of speech from one speaker to the next (Sacks et. al., 1974) [12]. One is the prevailing speaker picking up the next speaker by identifying him or alluding to him by many ways. One can use an address term or simply a gaze at someone at the end of a turn. Another strategy is the use of the first part of an adjacency pair, for example by a question or a greeting, which restricts the chosen speaker to turn out a suitable response or to return the greeting. A second technique for the current speaker is the restriction of the next utterance, without selecting the next speaker. A third option would be the current speaker not selecting another one but giving up the floor for a co-participant to select himself.

The fundamental building brick of Sacks et. al.'s theory [12] of turn taking is turn-constructional unit (TCU). It refers to part of speech, by the end of which a new speaker can begin talking. TCUs are complete units in terms of intonation contours, grammar and semantics. The TCU has approximately the same meaning as the word 'utterance'. It is a complete sentence, a phrase, or even a word in grammar. The accomplishment of a TCU results in a transition relevance place (TRP). A TRP declares the possibility for another speaker to begin speaking. One or more TCUs uttered by the same speaker make up a turn, and if all goes well, a smooth conversation is the outcome. TRPs are points where it would be possible for another speaker to take the floor. To clarify the successive turn transitions without gaps or overlaps, Sacks (1974) and associates [12] advance the hypothesis that listeners are capable of projecting TRPs prior to their occurrence. The capability to project the exact time of a TRP occurrence presupposes the capability to project a 'turn completion point' (TCP). They have just assumed that a TRP can take place at a probable syntactic completion point, with intonation playing a crucial role.

Sacks et. al's., (1974) [12] approach has influenced various studies in conversational analysis in general and in the examination of turn taking systems in specific. However in spite of their influence, they did not give a strict definition of the TRPs. Ruiter et. al. (2006) [10] have suggested that Sacks et. al. (1974) [12] have not attempted to define what is included psychologically in producing an accurate projection of turn end. Furthermore, Levelt (1993) cited in Raux, Langner, Bohus, Black, and Eskenazi (2005) [13] has insisted on the fact that the stringent use of syntax is problematic since spoken language seldom comprises well-formed complex constituents because of its disfluencies. More exhaustive discussions of turn projectability in conversations have been the focus in successive decades.

Many analysts have intended to identify the characteristics of TRPs and their projectability through the study of the possible turn taking signals. Duncan (1973) [14] has investigated face-to-face American English conversations. He confirms that speakers make use of complex cues at the end of turns. He suggests that the signals for speaker change may be grammatical, paralinguistic or kinesic, or any combination of the three. A hearer can take the turn when he depicts a turn signal from the part of the speaker. These signals, or also called 'displays' can be one or more of the six performance signals:

a- Intonation: Use of a terminal juncture (e.g., a rise tone at the end of a yes/no question).
b- Paralanguage: (e.g., Final syllable Lengthening at the end of a clause).
c- Body movement: (e.g., Rest of a hand movement).
d- Sociocentric sequences: Use of interjections like 'well', 'you know', etc.
e- Syntax: Completion of a grammatical sentence comprising a subject and a predicate.

Duncan uses the term 'back channel behavior' to talk about the signals that do not represent the turn, but that give to the speaker the helpful information as his turn evolves. Types of back channels can be 'sentence completions', 'requests for clarification', and 'brief restatements', all of which are considered by Sacks as complete turns. Therefore, Duncan classifies all utterances as either 'back channels' or 'turns'.

The existence of one turn signal does not necessitate speaker change (Duncan & Niederehe, 1974) [15]. However, the more signals occur concurrently, the more the possibility that the listener will take the floor. Once s/he begins speaking, s/he typically uses 'a speaker state signal' which can be one of the following signals: an averting gaze (Kendon, 1967) [16], a beginning of a bodily movement, a big perceptible intake of breath, or a paralinguistic extended loudness. Allies of Duncan praise his work for being the first to declare the existence of complex turn taking cues. This major finding has prepared the path for many successive investigations on turn taking. Indeed, authors concerned with the quantitative study of turn taking (Ford & Thompson, 1996 [17]; Furo, 2001 [18]) have provided more operational definitions of syntactic TRPS, in addition to expanding to the types and definitions of TRPS.

Duncan's works have been condemned by some conversational analysts namely by Beattie (1981) [19], and Culter and Pearson (1986) [20]. They believe that Duncan's investigations lack: (a) 'A formal objective description of the cues observed, his data are merely his own subjective impressions' (b) 'A stronger statistical analysis based on a larger sample size (Gravano & Hirschberg , 2011. p. 603) [21]. Furthermore, Ducan's [14] results go in opposition with Gravano's (2009) [22] findings on the effect of some turn taking cues. Duncan [14] declares that in American English, a pitch level terminal junction combined with a pitch other than an intermediate pitch level can indicate a turn yielding intention. However, Gravano's [22] examination of the rising intonation suggests that a high rise (H_H%) indicates turn taking, a plateau (H_L%) indicates turn holding, and a low-rise (L_H%) is unclear. On the other hand, Local, Kelly, and Wells (1986) [23] assert that a rise intonation and an increased phrase final lengthening have turn taking functions in Tyneside English.

Ford and Thompson (1996) [17] have investigated two of Duncan's [14] turn taking signals: intonational and grammatical completion points at turn boundaries in two American English conversations. They change 'grammatical completions' for 'syntactic completion points', and describe them as 'potential terminal boundaries for a recoverable clause so far' existent in the discourse context, autonomous from intonation or pause' (p.143). As for intonation, they present a twofold division between final and non-final pitch contours. The former type includes either the rising or the falling tones, while the latter comprises all the remaining types. They uncover the binary operation of a syntactic completion point together with a rise or fall final pitch contour as significant to turn taking. They shed light on the outstanding role of intonation in marking the organisation of discourse.

Nonetheless, they have looked at intonation from a perceptual point of view. They adopted Du Bois, Schuetze-Coburn, Cumming, and Paolino's (1993) [24] definition of intonation as: a stretch of speech pronounced under one coherent intonation contour. In fact, they have been mostly based on acoustic, prosodic and timing signals in order to manually categorise the boundaries of units. They have not devoted the necessary investigation to the syntactic contribution in turn organisation (Gravano & Hirschberg, 2011) [21]. Wennerstrom and Siegel (2003) [25] have improved Ford and Thompson's [17] approach to the investigation of turn taking organisation. They adopt a more accurate definition of intonational final pitch contour grounded on Pierrhumbert's (1980) [26] ToBi transcription system. They make use of six phrase final pitch contours: high rise (H-H%), low (L-L%), plateau (H-L%), low rise (L-H%), partial fall (L-L%), and no boundary (Gravano & Hirschberg, 2011) [21]. They report that high rise is the most important signal to turn leave (67% occur at speaker change), followed by low pitch contour (40% occur at speaker change). The rest of the phrase final pitch contours are associated with turn hold. Besides, they confirm Ford and Thompson's (1996) [17] interaction between intonation, pauses, and complete syntactic units as indicators of speaker shift. Besides, Ford, Fox, and Thompson (1996) [27] add that TCUs are evolving, rather than pre-defined, and that syntax, prosody, and gesture all participate in identifying the fundamental unit of speech.

Another investigation aimed at examining the role of intonational cues in turn projection. Caspers (2003) [28] studied interactions based on Map Tasks. Like Ford and Thompson (1996) [17], she has found a recurrent coincidence between syntactic and intonational completion points. She adds that there are two tones that may be correlated with turn holding. These are a rise followed by high level pitch (H*_%) used for linking between syntactically split utterances, and a filled pause (longer than 100 msecs) followed by a boundary mid level tone, used for correlating hesitations with syntactic components. In addition, she asserts that leaving the turn is the unmarked condition, while holding it is to be marked with specific tones.

Syntax as a perceptual cue to turn taking has not been investigated in isolation, but generally in combination with other cues. For example, Quirk, Duckworth, Rusiecki and Colin (1964) [29] have found out a high correspondence between 'intonation units' and different types of syntactic units such as sentence and clause boundaries. On the same line, Ford (1993) [30] has declared that intonational and syntactic units coincided to signal a probable turn change. However, a major problem in dealing with syntax as a perceptual cue is the very delimitation of a definition to a syntactic completion point. Sacks et. al. (1974) [12] first and foremost have elaborated on the syntactic organisation of the units when observing their structure and recognisability. The type of syntax compatible with their model is a particular one (Selting, 1996) [31]. They characterise it as 'a syntax conceived in terms of its relevance to turn taking' (Sacks et. al., 1974. p. 721) [12]. More details on the problems that relate to this kind of syntax are proposed by Schegloff (1979) [32]. In fact, this latter has proposed to develop a new model of syntax, which he labels 'an interactionalist syntax-for-conversation'.

Selting (1996) [31] has dealt more in depth with the units that are relevant to Sacks et. al.'s (1974) model [12]. She has done an investigation on the relationship between syntax and prosody in the production of turn constructional units and turns in conversation. She has intended to give a close account of the projectability of units, and of the work of 'turns -at-talk'. She has done her analysis on the basis of informal conversations between three participants who speak a variety of North Western Standard German. She has introduced the notion of 'schema' to denote the syntactic organisation of 'a flexible, dynamic, and situationally adaptable linguistic structure' (p. 359). That unit can be fairly long, making the syntactic projection quite far. She concludes that syntax alone cannot function as a turn holding device beyond the schema. Instead, syntax and prosody work together to signal the division of speech into turn constructional units, and to mark the turn constructional units as 'internally cohesive units'. Finally, she declares that the 'the syntactic units are locally contextualised by prosody' (p.384).

Gravano and Hirschberg (2011) [21] describe some of the studies presented above as observational. They condemn them for compiling merely indirect evidence of turn taking cues, being based on the 'optional' conversational judgments. They justify their assertion by the fact that a hearer who does not want to speak can choose not to use the cues offered by the speaker. They add that the use of spontaneous conversations does not allow the inspection of the different features of turn taking. To deal with such issues, there have been many experiments of production and perception that have tried to replicate the turn taking decisions of natural conversations in the laboratory. In typical production investigations, the respondents read or perform made-up dialogues with controlled utterances. In typical perception dialogues, the respondents categorise utterances into turn take, turn hold, or turn leave based on the predicted speaker's intentions. Gravano and Hirschberg (2011) [21] add that similar settings provide the experimenter with a great control of the experimental circumstances.

To come to the point, the investigations presented above varied their points of interests as to which approach of investigation to follow, and which type of TRP feature to examine in the analysis of turn taking systems. They have formulated different premises as to the information sources that hearers might use in projecting turn completion points. Seemingly, these studies offer various results because of the differences in the inspected language, the tested sample, and the adopted framework. However, it is not easy to compare some of the results because most theories have been basically influenced by conversational analysis. The theoretical framework of Sacks et. al. (1974) [12] has represented the building brick for CA's analysis tradition to inspect the appropriate phenomena. Nonetheless, to identify and process these behaviors, quantitative studies are needed to uncover larger data. Gravano (2009) [22] has examined the correlates of speaker change in various corpora, but few investigations have untaken experimental studies on turn taking.

Hami (2017) [1] inspected the role of intonation as a perceptual cue in regulating the turn taking organisations of English and TA. Results proved that the two languages arrange their conversations based on the following features: **Turn leave** was shown by a drop in energy and inhales, and a fall in pitch (L%) at the end of the intonation phrase unit (IPU). **Turn hold** was indicated by a high final pitch contour (H%), a perceptible intake of breath, intermittent pauses, filled pauses and a boundary mid level tone. **Turn Take** was illustrated by a rise of pitch (H*) via previous speech, following: a low final pitch contour (L%), a level or high final pitch contour (by interruption/overlap), or pauses and drop in intensity. It was concluded that intonation plays a moderate to low role in regulating turn taking in both languages. Context was helpful in turn detection, but not

in filtered speech. The results of this investigation are used in combination with the present study to check the interface between the cues of intonation and syntax in organising TA conversations.

Remaining untested and awaiting for empirical research is an examination of the cue of syntax as a turn regulator, and the crossing points between intonation and syntax in the arrangement of TA speech. According to the above investigations, the cue of syntax can sometimes work in isolation or together with prosody as perceptual cues to organise turn taking. In the present study, investigating the cue of syntax aside and in combination with intonation can give better insights on the turn taking system of TA. Accordingly, this article addresses the following research questions:

- Does syntax play a role in organising the turn taking system of TA?
- Is there an interface between intonation and syntax to better organise the turn taking system of TA?

To answer the two research questions, the quantitative approach of analysis was employed through the use of a judgement test. The judgment test is an elicitation technique 'widely used to test the metalinguistic ability of the learners' (Seliger & Shohamy, 1989. p. 17) [33]. It is based on presenting the test-taker with right and wrong language items, and waiting for him to decide whether they are acceptable or not. According to Schütze and Sprouse (2011) [34], the judgment test involves the respondents' spontaneous reactions towards some set of words. They add that judgment tasks can be of two categories: non-numerical tasks and numerical tasks. Relevant to the present judgment test are non-numerical tasks, namely the forced-choice (FC) questions. Using this type of questions, the participants were presented with a limited set of conditions, and asked to select one acceptable answer. FC tasks are explicitly intended to make a qualitative comparison between the provided conditions.

Schütze and Sprouse (2011) [34] add that there are benefits of using FC tasks in data collection. First, FC tasks are easy to organise, because every such a task can constitute an experiment in itself. Second, FC tasks can offer increased statistical power to detect the differences between the conditions. They add that 'FC tasks are the only task explicitly designed for the comparison of two (or more) conditions' (ibid. p.6). The judgement test involved forced-choice (FC) questions that reported the respondents' spontaneous reactions towards the parts of speech. The participants were presented with a limited set of conditions, and asked to choose one acceptable answer. They had to select from the following set of choices: turn take, hold, and leave; +/-speaker change. They were asked to report the cue they used to select the appropriate choice.

The hypotheses are that a syntactic completion point can be a cue to a probable transition relevance place, and that coordinating syntax and intonation can better help in organising TA turn taking. It stays to decide on a definition of a syntactic completion point. In fact, syntactic information are significant (Sacks et. al., 1974) [12]. An independent TCU is one that can be analysed as a syntactic entity, whether a sentence, clause, phrase, or word. Every syntactic unit can be an element of projectability to the hearer, who can deduce that a unit is probably complete from a syntactic viewpoint.

Syntactic completion points (SCPs) are 'projectable units' that can sometimes be associated with speaker change in a conversation, but not always (Ford & Thompson, 1996) [17]. In context, a SCP is delimited incrementally based on finding out 'a recoverable subject and an overt predicate'. In other words, a syntactic completion point can be judged in association with a previous predicate, if one exists. A syntactic incompletion, however, is judged in relation to a planned forthcoming predicate. In view of that, SCPs include elliptical clauses, adjacency pairs (questions and answers), and reactive token responses (minimal turns) (ibid). Concerning intonation, Hami (2017) [1] defined IPUs or Intonation Completion Points (ICP) as perceivable units, roughly analogous to Cruttenden's (1986) [35] auditory intonation groups. They can be delimited by two main features: pitch and timing. Indeed, the end of an IPU can be indicated by a) The pitch pattern and its direction on the stressed syllable, and a change in the pitch of a prior speech b) Timing signals including amplification in the rhythm of unaccented syllables, final syllable lengthening, and discernible pauses of more than 300 msecs.

This paper is organised into three main parts. Part two presents the research method section. It includes a description of the materials, the syntactic framework adopted to inspect them, a justification of the validity and reliability of the stimuli, a portrayal of the production and perception participants, the data gathering procedure, and the statistical analysis of significance for nominal data. Part three encompasses the analysis and discussion sections. It explains the turn taking organisation in TA and discusses the experimental results of this study.

II.   RESEARCH METHOD

2.1. TA materials

In this investigation, the corpus of analysis was extracted from a TV conversation between two native speakers of TA. The 'Audio recording' data gathering instrument was 'used as a check on a coding conducted live, without necessarily writing a transcript'. It enabled to preserve 'more information which may be necessary to decide between coding categories, such as intonation and other paralinguistic cues' (Mc Donough & Mc Donough, 1997, p. 110) [36]. Accordingly, audio-recording was used to preserve the linguistic and the

paralinguistic characteristics of the conversation. The gathered data were then stored in the computer in a digital format, to be played back to the perception groups.

The TV program is a talk show based on an interactive conversation between two speakers. The presenter tries to uncover the points of view of well-known Tunisian people (musicians, actors, singers, etc) with regards to their jobs. He tries to provoke the guest by announcing some false judgements, while the guest tries to defend his ideas. The interviewee is a manager of the photograph, dramatist, and scenarist. In the sense of Stubbs (1983) [37], this conversation can be judged natural, as it occurs without the interference of the linguist. It is uttered in answer to some immediate situational requirements. The speakers would not figure out that their conversations can be analysed syntactically. The TV presenter and his guest represent the control group.

2.2. Analysis of the materials

The TV conversation was recorded by the Cool Edit Software, and then transferred to the Praat Software in the form of speech files. Praat facilitated the segmentation of the conversation into short dialogues, sentences, and sentence fragments, guided by the following characteristics: a) Turn Leave+ Low final pitch contour (L%) + Syntactic completion point b) Turn Leave + (L%) – syntactic completion point. The same was done with turn take and turn hold, but with different pitch types. Besides, Praat enabled to filter the same portions from speech. This was done to remove all facilitators of intelligibility except pitch. The inspiration of dividing speech into portions was taken from Caspers (2003) [28]. Figure 1 below portrays the spectral analysis of a TA sentence. The ToBi system of Pierrehumbert and Hischberg's (1990) [38] enabled the transcription of speech melody. For more details, see Hami (2017) [1].
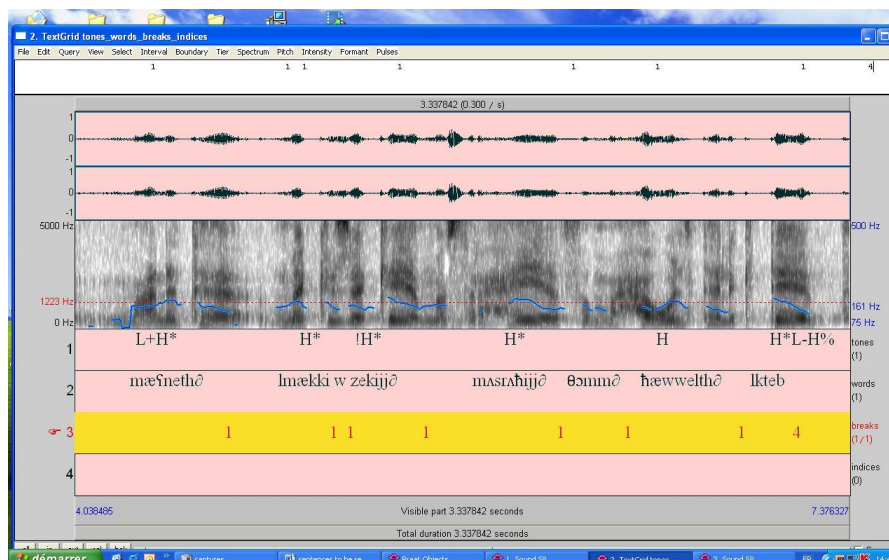

**Figure 1.** Segmentation of speech by the Praat software

Concerning the syntactic analysis of the dialogues, they were classified into contextualised sentences, and the same sentences out of context. The contextualised sentences were analysed in the light of three major notions: recoverability of reference (i.e., there should be a recoverable subject and an overt predicate, including elliptical clauses, adjacency pairs, and reactive token responses), satisfaction of the fragment condition ('only constituents can serve as sentence fragments', Radford, 2009. p.62) [39], and satisfaction of the maximal projection principle ('only a maximal projection can serve as a sentence fragment', Radford, 2009. p.63) [39]. Radford's (2009) [39] Minimalist Approach of analysing English sentences was adopted for examining the present data.

The isolated sentences, however, were examined for their well-formedness based on Chomsky's approach of Universal Grammar (UG) [40]. It should be mentioned that some principles of Traditional Grammar (TG) were employed for presenting the basic functional categories of the sentence. Going through the well-formedness conditions of sentences, there are many criteria that should be met. Only the most relevant to this study are presented. The conditions are as follows:

(a) Presence of the major functional categories that form a sentence: the basic assumption in traditional grammar is that sentences and phrases are composed of a string of constituents. Each constituent belongs to a grammatical category, and plays a specific grammatical function. In fact, sentences and phrases are composed of a string of **constituents**, each constituent belongs to a **grammatical category**, and plays a

specific **grammatical function**. In TG, words are classified into grammatical categories based on their semantic properties, morphological properties, and syntactic properties. Traditionally, there are two types of words: **contentives**, which belong to lexical categories, and **functors** which belong to functional categories. Lexical categories comprise nouns, verbs, adjectives, adverbs, and prepositions, while functional categories include determiners, quantifiers, pronouns, auxiliaries and conjunctions.

(b) Satisfaction of the Extended Projection Principle (EPP). This includes satisfying the 'Headness principle' (that the head of the phrase sets the grammatical properties of its complements), and the 'Binary principle' (that phrases are formed by a binary operation of merging two constituents into a larger one). For instance, the clause 'that we are able to help you' was analysed by Radford as shown in the following Labeled Tree Diagram (LTD). (CP: complementiser projection; TP: Tense Projection; and PRN: pronoun).
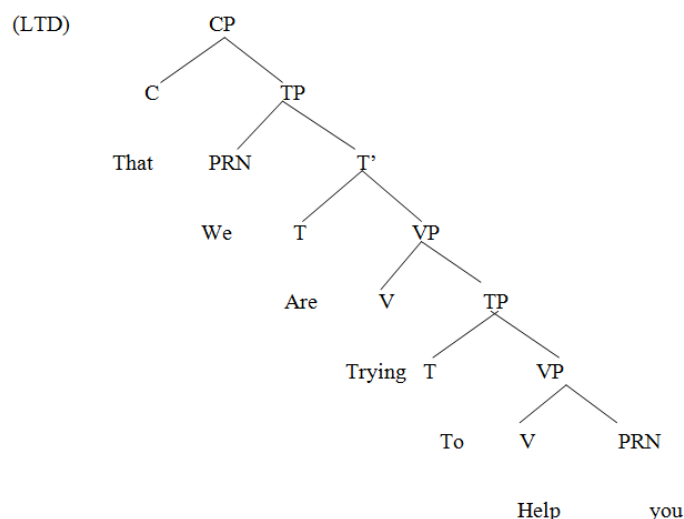
Accordingly, phrases, clauses, and sentences are projections of their head words. In addition, phrases are built up by a series of merger operations in a bottom up process. The words at the bottom of the tree are merged by binary operations from words to phrases, and from intermediate projections to maximal projections until reaching the higher part of the tree. Concerning verbs, in particular, their projections are delimited thanks to a satisfaction of their sub-categorisation frames and a satisfaction of the Theta Criterion.

(c) Satisfaction of the sub-categorisation frames of verbs means that sentence completion depends on the presence of the complement that the verb takes (Brinton, 2000) [41]. Table 1 below summarises the sub-categorisation frame of verbs (ibid).

Table 1. The sub-categorisation frame of verbs

Verb Types	Frame	Verb Uses
Intransitive	_____ #	No complement is required or allowed. The verb can be followed by an adverb.
Monotransitive	_____ DP	The complement of the verb is a Determiner Phrase (DP). It functions as its direct object.
Ditransitive	__DP1 DP2 __DP2 PP [to/for DP1]	DP1 plays the function of the indirect object, while DP2 plays the function of the direct object.
Copulative	__{DP, AP, PP}	The complement plays the function of the subject complement. It can be a DP, an Adjective Phrase (AP) or a Preposition Phrase (PP).
Complex transitive	__DP1{DP2, AP, PP}	The complex transitive verbs merge the transitive and the copulative constructions. DP1 is the direct object, while DP2 is the object complement. Complex transitive verbs are of two types: non-locative and locative.
Prepositional	____PP	The PP plays the role of the complement of the verb. It is called a prepositional complement. The prepositional verbs are of two types: locative and non-locative.
Diprepositional	_____PP PP	The two PPs complement the verb.

(d) Satisfaction of the Theta Criterion/ the Thematic Grid of verbs: Propositions (which hold the semantic meaning of the clause) are composed of a predicate and one or more arguments (Radford, 2009) [39]. For example, the arguments of a verb are its subject and predicate. Accordingly, the semantic roles are referred to as 'the thematic roles/theta roles (θ-roles). Chomsky (1981) [40] refers to this generalisation as the 'Theta criterion'.

Table 2. List of roles played by arguments with respect to their predicates, adopted from Radford (2009. p.245-6) [39].

(Thematic) Roles	Gloss
THEME	Entity undergoing the effect of some action.
AGENT	Entity instigating some action.
EXPERIENCER	Entity experiencing some psychological state.
LOCATIVE	Place in which something is situated or takes place.
GOAL	Entity representing the destination of some other entity.
SOURCE	Entity from which something moves.
INSTRUMENT	Means used to perform some action.

Accordingly, the sentence that fulfils the four criteria stated above can be judged as a well-formed sentence. When the sentence is grammatically complete, one can talk about a syntactic completion point. When the SCP leads to a turn change, there can be a turn leave. If the same speaker holds on, there would be a turn hold. A syntactic incompletion would be judged as a turn hold if in isolation, or if it has no recoverable subject in context. A syntactic incompletion is generally not followed by turn change. Yet, in the case there is, a turn take can happen in cases of interruptions, overlaps, reactive tokens or in the second part of an adjacency pair.

2.3. Validation of the stimuli
Perceptions have long been considered as 'a valid data type for the construction of cognitive theories' (Schütze & Sprouse, 2011. p. 3) [34]. Validity, in turn, refers to 'the extent to which the data collection procedure measures what it intends to measure' (Seliger & Shohamy, 1989. p. 188) [33]. In the present investigation, the validity of the judgment test was ensured thanks to a pilot study. A first step was to do item analysis at the piloting stage for the purpose of examining the quality of the items: their clarity, comprehensibility, and well-formulation. Second, face validity was ensured for including 'relevant, important and interesting' items (McCowan & McCowan, 1999. p.4) [42]. Concerning reliability, its function is to check 'whether the data collection procedure is consistent and accurate' (Seliger and Shohamy, 1989. p. 185) [33]. The pilot phase permitted to revise and modify some unclear questions and items on the basis of the new information. This assessment improved the reliability of the process.
Ten undergraduates, representing about 10% of the estimated population of respondents tried out the stimuli (Connelly, 2008) [43]. This group was exposed to the parts of speech in question, and asked about their clarity. They were also asked about the adequate time and the suitable number of re-listening required answering the questions. The piloting took place in an empty room, remote from any exterior noise. The gathered remarks were taken into consideration to fine-tune the instrument. Some items were removed, while others were adapted to extend the time administration, or to simplify some of the instructions.

2.4. Participants
A Non-probability sampling method was used in the collection of the perception groups. According to Battagila (2011) [44], sampling encompasses the selection of part of a finite population being studied. Hence, one production group and three perception groups took part in this investigation. The production group included two native speakers of TA enrolled in a TV conversation in their mother tongue. They represent the control group to the speech of which the perception groups were exposed. The perception group included eighty seven participants. They represent three teams of Tunisian Arabic speakers, belonging to three educational levels. The groups comprised twenty seven university teachers of English, thirty second-year university students majoring in English, and thirty students at their final year of secondary school instruction. All the respondents are native speakers of TA, each group belonging to the same socio-linguistic background and age interval. They were all exposed to the grammar rules of Classical Arabic, French, and English, but with different degrees of difficulty. This could probably affect their awareness with the syntactic completion points in the experiment dialogues. Concerning the respondents' awareness with intonation, the teachers and university students are supposed to be aware and trained on English intonation (not TA intonation), but not secondary school students.

2.5. Data gathering procedure
    The respondents were asked to fill in their judgements on two perception experiments. In the first perception experiment, the respondents were asked to listen to isolated sentences and: a) to judge whether there was a turn take, hold, or leave, 2) to predict a probable speaker change, and 3) to specify the cue that they used for their guess. They were encouraged to provide an explanation of their selections. In the second experiment, the respondents were exposed to the same isolated sentences of the first experiment, but within short dialogues. They were asked to judge turn types relying on the factor of context. They had to follow the three tasks of experiment 1. Reminding of the same investigation on intonation (Hami, 2017) [1], the respondents were asked to select the type of final pitch contour of the fragment. They were provided with four major possibilities (rise, fall, level, and unclear) to facilitate the task for non-specialists. In another experiment, the same isolated sentences were filtered from all lexical items, losing all the semantic and syntactic cues necessary for their understanding. Only pitch was maintained to check the effect of pitch only on the turn recognition.

2.6. Statistical Analysis
    Statistical tests of significance for nominal data (Phi correlation coefficient) were employed to contest or prove the research hypotheses. The significance level (α) should be less than or equal to ($\leq$) 0.05, because the degree of freedom is 1(df = 1). The statistically significant results reveal the respondents' detection of turn constructional units and transition relevance places. The SPSS software was used to determine the number of respondents who agreed on a precise judgement about a precise test item. The purpose was to contest the null hypothesis of no association between the variables. The allocation of the statistically considerable agreements over the items of each test was then inspected to verify which tasks resulted in the largest number of significant items, and what were the cues existing within those items.

III. RESULTS AND DISCUSSION

Prior to the statistical analysis, each part of speech was classified by the investigator as a case of turn take, turn hold, or turn leave. Table 3 presents the turn taking organisation of the TA sentences based on the syntactic cues.

1.1. Turn taking organisation in TA

Table 3. Syntactic cues present in the TA data

	TA in Isolation			TA in context	
	Syntactic cues	**Turn type**		**Syntactic cues**	**Turn type**
S1	Interrogative force: yes/no question.	Leave	S1	First part of an adjacency pair.	Leave
S2	Interrogative force: wh-question.	Leave	S2	First part of an adjacency pair.	Leave
S3	Fulfils the well-formedness conditions.	Leave	S3	Second part of an adjacency pair and recoverability of reference Answer with an ellipsis.	Take Leave
S4	Satisfaction of the sub-categorisation frame of the verb and the major functional categories of the sentence.	Leave	S4	Turn hold after a syntactic completion.	Hold
S5	The subcategorisation frame of [keenə] is not satisfied.	Hold	S5	Interruption of a previous speaker before a SCP.	Take
S6	A verbless sentence considered as complete in TA.	Leave	S6	Interrupted speaker but he maintained the floor by a recoverable PP.	Hold
S7	The tense projections of the verbs are present, together with the major functional categories of the sentence.	Leave	S7	Turn hold after a syntactic completion.	Hold
S8	The sub-categorisation frame of the verb is fulfilled.	Leave	S8	Interruption of a previous speaker during a filled pause.	Take Leave
S9	The major functional categories of the sentence are	Leave	S9	Use of a coordinating conjunction to begin the floor.	Take

				The major functional categories of the sentence are present.	Leave
S10	The sub-categorisation frame of the verb is not fulfilled, but could be understood as an ellipsis.	Leave	S10	Interrupted speaker with recoverability of reference.	Leave

Table 3 exhibits the cases of syntactic completion and incompletion points, together with their corresponding turn types. Turn Leave was depicted (a) at the end of the first part of an adjacency pair in the case of yes/no or wh- questions, (b) when the major functional categories of the sentence are met (c) when the sub-categorisation frame of the verb is fulfilled (d) when the turn is a short answer with ellipsis (e) and when a current speaker is interrupted. Turn Hold was indicated in the case (a) the sub-categorisation of the verb is not satisfied (b) after semantic completions tailed by new starts by the same speaker (c) and after interruptions, where the speaker maintained the floor by recoverable phrases. As for Turn Take, it took place (a) starting the second part of an adjacency pair, (b) interrupting a previous speaker before a SCP or during a filled pause (c) and using a coordinating conjunction to begin the floor.

1.2. Description and discussion of the results:
1.2.1. Role of syntax as a turn regulator

Table 4 represents the significant values related to the judgement of the respondents. As can be noticed, all the respondents used syntax at least once in making their judgements. Unfortunately, they used syntax only when there is a SCP. In fact, the group of teachers is the group with the most considerable values. On the contrary, the secondary school (SS) students and the university students used syntactic cues each group once.

Table 4. Significant values of the TA sentences that end in a plus SCP
+ SCP (S1, S2, S3, S4, S6, S7, S8, S9)

Educational level	Isolated Sentences	Phi values	Contextualized sentences	Phi values
SS sts	S3: Turn leave + cue of syntax	0.37	S3: Turn leave + cue of syntax	0.38
U sts	S7: Turn leave - speaker change	0.47		
Teachers	S1: Turn leave + speaker change	0.48	S1: Turn leave + speaker change	0.38
	S1: Turn leave + cue of syntax	0.36	S2: Turn leave + speaker change	0.38
	S2: Turn leave + speaker change	0.41	S3: Turn take – speaker change	0.55
	S8: Turn leave + speaker change	0.48	S9: Turn leave + speaker change	0.47

The SS students used the cue of syntax only in isolated and contextualised S3, with a low degree of correlation. The Phi values were 0.37 in isolated S3, and 0.38 in context. Yet, they did not relate turn leave with speaker change. The University students related turn leave with speaker change in isolated S7, with a Phi value of 0.47. As for the teachers, they coordinated turn leave with the cue of syntax and speaker change in isolated S1 with Phi values of 0.36 and 0.48 respectively. They recognised speaker change in contextualised S1 too. Similarly, they related turn leave with speaker change in isolated and contextualised S2 with Phi values of 0.41 and 0.38 respectively. Sentence 8 was coordinated with speaker change in isolation and the same for contextualised S9. The two other levels recognised only 2 sentences with the correct judgements. There is one case of SCP minus turn change recognised only by university students.

The results of this experiment show that syntax plays a moderate role in arranging turn taking in TA. This is clear from the degree correlations that do not exceed 0.5. This goes in line with Ford & Thompson's (1996) [17] investigation when analysing the cue of syntax in isolation, separated from intonation and pragmatic cues. They affirmed that 'of the three types of completion, then, syntactic completion points alone are the least reliable indicators of any other sort of completion' (p. 155). Syntax is clearly more central to teachers, when contrasted with the other groups. This can be explained by their awareness with grammar rules in general. Some of them are specialising in English and TA syntax.

Only the sentences that end in a plus SCP have reported significant results. This could show that the TA respondents use syntax only when the sentences are grammatically complete. They may be using other cues, when the sentences are incomplete. Probably, they may be relying on intonation or meaning. The respondents did not coordinate SCP with the cue of syntax only. They related it to speaker change. This can be explained by the fact that the TA students are not aware of their use of syntax in identifying speaker change. Concerning context, it did not give more significant results than the isolated sentences.

The results of the TA data go in line with the findings of the English data presented in the theoretical part. In fact, when the conditions of turn taking are respected, a speaker can talk if there is a SCP (Sacks et al, 1974) [12]. Unlike the English data, the TA sentences comprise cases of plus SCP minus turn change. After a syntactic completion point, the same speaker holds the turn and begins a new idea. This finding can be confirmed by Wichmann and Caspers' (2009) [45] analysis of the English language. They confirmed that when the syntax of a sentence is complete, both turn hold and turn change can take place. Besides, Sacks in Coulthard (1977) [5] affirm that 'one can never be sure that an utterance is complete- it is always possible to add more to an apparently complete utterance, and speakers frequently do so (p.61). Concerning the cases of overlaps or interruptions, no significant values have been reported. The respondents could have dismissed the use of syntax in finding out the type of turn in problematic cases. Even if Tunisian Arabic is their mother tongue, they were merely able to report significant results on turn leave. They associated it more frequently with speaker change than with the cue of syntax.

Some researchers such Koiso, Horiuchi, Tutiya, Ichikawa, and Den (1998) [46] believed that a better investigation of turn taking would be on the inter-relationship between the prosodic and the syntactic factors of a conversation. They found out that in the Japanese language, the syntactic structure and a combination of prosodic cues can play an equal role in the turn taking system of the language. Besides, Caspers (2003) [28] suggested that the speakers of Dutch use intonation to draw attention to surface syntactic structures. They use intonation only incidentally to show their intention to keep the floor at the position where syntax allows turn change. In the following section, there is an investigation of the role of intonation and syntax together in the arrangement of the TA turn taking system.

1.2.2. Interplay of intonation and syntax as turn regulators

In this section, there is a tendency to give an acoustic correlate of the syntactic completion points which do and do not match with the intonational completion points. In case of convergence of two types of completion, together with speaker change, it is estimated that the respondents' recognition would be high. In the case of divergence, there it is estimated that the respondents would prefer one cue over another. Besides, there are cases of speaker change which do not coincide with completion points. These could be cases of interruptions and overlaps. Their frequency in the dialogues would show a violation of the turn taking rules, which could sometimes be meaningful (Ford & Thompson, 1996) [17]. The ultimate objective of coordinating the two types of cues and speaker change is to check whether the combination of the two cues can affect positively the judgements of the respondents. Furthermore, it would be important to find out which cue would be more significant in the case not the two signals are taken into account.

- **Intonational plus syntactic completion points**

The TA sentences S1, S2, S3, S4, S6, S7, S8 and S9 combine a syntactic completion point plus a high or a low final pitch contour. It also includes the possible turn changes within the dialogues. Table 5 presents the significant values among the respondents' judgements.

Table 5. TA isolated sentences which combine plus IPU + SCP + speaker change

	S1	S2	S3	S4	S6	S7	S8	S9
+IPU	NS	NS	NS	Teachers: phi: 0.36.	NS	NS	NS	Teachers: phi: 0.53.
+SCP	Teachers: phi: 0.36	NS	Secondary sts phi: 0.37.	NS	NS	NS	NS	NS
+/- speaker change	Teachers: phi: 0.48	Teachers: phi: -0.41.	NS	NS	NS	Teachers: phi: 0.38	University sts: phi: 0.40 Teachers: phi: 0.44.	NS

As can be seen from table 5 above, the group of teachers used the cue of syntax once, the cue of intonation twice, and predicted a probable speaker change three times. The group of SS students used the cue of syntax once, while the group of university students expected a speaker change once. Even though the sentences are syntactically complete, and the final pitch contours are clearly high or low, the TA respondents did not succeed all the judgments on their mother tongue. As for the significant results, there is a moderate to a low degree correlation between the variables, as the phi values did not go beyond 0.5. In fact, predicting a probable speaker change was recognized in 4 sentences out of 8. In other words, the respondents knew that there would be a turn change, yet they were not able to categorise the cues that they use. To sum up, the TA respondents

failed to recognise the majority of turn types and their corresponding cues, even though they were tested on their mother tongue. This is the case of the isolated TA sentences. As for the contextualised sentences, their significant values are reported in table 6 below.

Table 6. TA contextualised sentences which combine plus IPU + SCP + speaker change

	D1	D2	D3	D4	D6	D7	D8	D9
+IPU	NS	NS	University sts: phi: -0.45 Teachers: phi: -0.37.	NS	NS	NS	NS	Teachers: phi: 0.49.
+SCP	NS	Secondary sts: Phi: 0.38.	Secondary sts: phi: 0.38.	NS	NS	NS	NS	NS
+/- speaker change	Teachers: Phi: 0.38.	NS	Teachers: phi: 0.55	NS	NS	NS	NS	Teachers: phi: 0.47

It can be seen that the cue of intonation was used twice, once by university students (D3: phi=-0.45) and once by teachers (D3: phi=-0.37). Likewise, the cue of syntax was recognised twice by SS students (D2: phi=0.38; D3: phi=0.38). Concerning speaker change, only the group of teachers identified it three times with moderate to weak correlations (D1:phi= 0.38; D3: phi=0.55; D9:phi=0.47). Notably, the teachers maintained their level of recognition to speaker change in isolated and contextualised sentences. Accordingly, putting the sentences in their context did not give better results. Probably, the TA respondents were resorting to meaning in their classification of turn taking in Tunisian Arabic.

- **Intonational minus syntactic completion points**
There are only two TA sentences that do not end in a syntactic completion point. When isolated or contextualised, sentence 5 did not prove any significant result. However; the cue of intonation of S10 was important to university students only when isolated, with a phi value of 0.34. Therefore, when there was no SCP, one group of students resorted to intonation. Concerning speaker change, it was significant to university students with a phi value of 0.36. Therefore, the absence of a syntactic completion point did not affect the judgment of the respondents. These results prove to be contrary to the findings of Wichmann and Caspers' (2009) [45] analysis of Southern British English. They found out that incomplete syntactic completion points override the intonation cue. Only the high final pitch contour was a strong device to hold the floor.

According to the results presented above, the cue of syntax did not prove better results than the cue of intonation. About all the correlations were of moderate to low degree significance. However when combined, the cue of intonation overrides the one of syntax, whether with or without a syntactic completion point. As for speaker change, it proved to be sometimes significant to the respondents. Probably, the respondents were able to capture the arrangement of turns without being able to classify the cues they were using. They could also be using the semantic cues of the sentence or dialogue, a concept to be tested in a forthcoming paper. Ford and Thompson's (1996) [17] findings suggest that there should be an investigation of intonation, syntax, and conversational action, all of which permit the projection of a future turn. They affirmed that the major finding of their study is that the recognition of speaker change strongly relates to complex turn constructional units. Besides, the turn taking organisation of TA can be inspected from a socio-pragmatic point of view, alluding to the notions of dominance and social power.

IV.   CONCLUSION
Based on the so far found researches on turn taking, many characteristics of turn arrangement and interruptions are confirmed by the present investigation. However, it was difficult for the respondents to make the appropriate judgements on the presented data. The TA native speakers were not able to identify all the intonational or prosodic cues to TA turn taking. This is explained by Coulthard (1977) [5] who declares that 'intonation, the systematic patterning of prosodic features, is of course also a problem area- whereas native speakers have no difficulty using the system communicatively, they find it very difficult to introspect about the significance of the choices they make, and even to produce citation forms reliably and correctly' (p96-97). In other words, the native speakers are able to use language systems in their mother tongue to communicate, but are not really aware of their use. Another explanation can be the lack of explicit instruction on the phenomenon of turn taking.

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