Gestures as markers on non-canonical questions*

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Abstract

In this paper I argue that both the co-speech and pro-speech symbolic gesture MAT (*mano a tulipano*) used by native speakers of Italian characterizes non-canonical *wh* questions. MAT can with a fast tempo contour and a slow tempo contour. Tempo is semantically distinctive: descriptively, a fast tempo characterizes a biased but information-seeking non-canonical question; a slow tempo characterizes a rhetorical non-canonical question. I will argue that the fast contour is the default tempo of MAT and that it brings about a 'speaker bias' interpretation. Slowing down the movement occurs when the feature [slow] is added: the semantic contribution of this feature is to generalize the bias introduced by MAT to all discourse participants (all discourse participants agree about the answer to the question). The "doxastic harmony" imposed by [slow] is the source of the rhetorical interpretation of the question. I speculate that tempo plays a similar role in the interpretation of a second symbolic gesture used in Italian, i.e. *mani giunte* (MG).

1 Introduction

This study is a preliminary investigation of a symbolic gesture used by native speakers of Italian: the *Mano a Tulipano* gesture (MAT), sometimes also labeled *grappolo* or *carciofo*. MAT can be used as co-speech and pro-speech gesture. Briefly described, MAT involves a path movement by which the speaker positions her hand at the level of her torso and during which the hand achieves the "tulip" configurations, i.e. all fingers tips touch, as shown in Figure 1. This path movement is then followed by a local movement generated at the wrist. Borrowing terminology from [16], I will call this local movement a "trill": the hand moves repeatedly up and inward towards the speaker.

Figure 1: MAT

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During our investigation of MAT, we will also consider a second symbolic gesture used by native speakers of Italian, i.e. the *Mani Giunte* gesture (MG). In MG, shown in Figure 2, both hands come together in the "prayer" position at the level of the torso and then move repeatedly up and down in place.

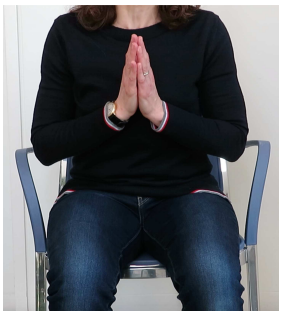


Figure 2: MG

Previous descriptive literature on gestures ([12], [15], [5], among others) has pointed out that both co-speech MAT and pro-speech MAT seem to have an interrogative component and are found in pragmatically marked constituent questions. For example, in his study of gestures used by speakers of a Southern Italian dialect spoken in the city of Naples, [12] suggests that a speaker uses MAT when confronted with something that undermines her expectations and therefore demands an explanation. More recently, [8] and [9] found occurrences of co-speech gestures MAT (which they call *carciofo*) and MG accompanying what they label *surprise/disapproval* questions (questions also marked by a special, non standard, intonation, and often introduced by the adversative coordinating conjunction *ma*, 'but').

With respect to the first observation (i.e. that MAT occurs in constituent questions), in line with the authors cited above, I am going to assume that MAT marks a *wh*-operator in a constituent question. As for the second observation made by the previous literature (that MAT is used to express surprise or disapproval), I will rephrase it by saying that MAT characterizes *non-canonical questions* as defined for example by [4], [7], and others. Non-canonical questions are questions where some of the assumptions which characterize standard (canonical questions) have been dropped. For example, canonical questions are characterized at the very least by two assumptions: an assumption that the speaker is ignorant about the answer to the question that is being asked, and an assumption that the addressee is competent about the answer to such a question. Unlike canonical questions, non-canonical questions are somehow marked: for example, they might have a non-standard syntactic form, or they might have a non-standard intonation. In the course of this paper, I will argue that the kind of questions marked by MAT are characterized by the absence of the speaker's ignorance assumption. More specifically, I will argue that the *tempo* of MAT correlates with the kind of non-canonical question that is asked: a *fast* tempo MAT marks a non-canonical *biased* question, whereas a *slow* tempo MAT marks a non-canonical *rhetorical* question. I take a question to be biased if it signals that the speaker has a non-neutral doxastic attitude towards the possible answers to the questions and that there is a situation of doxastic *conflict* in the context: in this case, the question is still information-seeking and the goal of the speech act is ultimately to resolve the doxastic conflict. On the other hand, I take a question to be rhetorical if it is "doubly-biased", that is, if it signals that both speaker and addressee have the same bias towards the answer to the question and that there is a situation of doxastic *harmony* in the context. So far, researchers

have focussed on the way that different kinds of declaratives and interrogatives sentences are characterized by different kinds of intonational contours ([11], [13], [14], [10], among others), where each intonational contour is identified as having a particular meaning (in the broad sense of the word). Borrowing the terminology from the literature on prosody, our hypothesis is that there are two semantically distinct *tempo contours* for MAT (and MG as well): the *fast contour* (FC), which characterizes a speaker-biased question, and the *slow contour*, which characterizes a rhetorical question.

Previous research and observations on these gestures are consistent with my hypothesis that both MAT and MG when used as co-speech gestures mark non-canonical questions. The research that I am reporting in this paper builds on this idea and expands it in two ways: (i) by looking at two different kinds of non-canonical questions that MAT and MG can mark and the specific feature of the gesture that characterizes each kind; (ii) by looking at *pro-speech* MAT and MG in order to establish whether the relation between the gesture and the meaning that is conveyed is direct and not mediated by the spoken utterance.

2 Hypothesis: tempo is significant

There are at least two kinds of non-canonical questions:[1] biased questions and rhetorical questions.[2] As we pointed out in the introduction, just like canonical questions, biased questions are information-seeking questions; however, unlike canonical questions, biased questions indicate that the speaker is not doxastically neutral towards the answer to the question. In uttering a biased question the speaker communicates that she has a bias towards one of the possible answers to the questions. Asking a question while at the same time communicating that the speaker has a bias towards an answer to the question is appropriate in a situation in which there is doxastic conflict, that is, in a situation where the speaker has reason to believe that the addressee might provide an answer to the question different from the one the speaker expects. In other words, speaker bias and the information-seeking nature of a question are compatible in a situation in which there is doxastic conflict with respect to the question under discussion. Rhetorical questions, on the other hand, are so to speak "doubly-biased" questions: the speaker and the hearer share the same bias. Since a rhetorical question conveys that both the speaker and the addressee have the same bias towards the answer to the question, in uttering a rhetorical question the speaker cannot be seeking information. Based on linguistic judgments of native speakers of Italian, I formulated the hypothesis that the type of non-canonical question marked by MAT depends on the tempo contour of the gesture: a fast contour (FC) marks an information-seeking biased question; a slow contour (SC) marks a rhetorical question. The same hypothesis holds for MG. The goal of the research reported in this paper was to test this hypothesis and to provide a semantic analysis consistent with the findings. This preliminary study is divided in two parts: a preference task and a forced choice task.

2.1 Part I: preference

In this part of the study, I recruited 13 native speakers of Italian, all undergraduate students at the University of Milan, Bicocca. 12 videos were prepared, each targeting a particular gesture: 4 out of these 12 videos were constructed to test our hypothesis concerning the semantic difference

[1] There are more kinds of non-canonical questions but the two I mentioned in the text are the ones that are relevant to the current project.

[2] In this paper, I will use the term 'questions' and 'interrogatives' interchangeably since here I am only looking at interrogative sentences.

between MAT-FC/MG-FC on the one hand and MAT-SC/MG-SC on the other; the other 8 videos targeted unrelated gestures. For each video, each participant (i) read a short paragraph on the screen describing a scenario ending with a character saying something; (ii) heard a sentence pronounced by this character, while the screen was dark; (iii) was shown four gestures made by the character who pronounced the sentence they heard. The face of the person making the gesture in the video could not be seen. Each participant was asked to rate each gesture on a scale from 1 to 7 with respect to how appropriate the gesture was, given what they heard the character say (1 = least appropriate, 7 = most appropriate). For the 4 relevant videos, the sentence that the participant heard was pronounced with either a biased/information-seeking intonation or with a rhetorical intonation. The target gesture was the one hypothesized to match the intonation of the utterance: the FC gesture for the biased-information-seeking intonation and the SC gesture for the rhetorical intonation. Whenever a MAT-FC/MG-FC was the target gesture, the video showed the competitor MAT-SC/MG-SC as well as two unrelated gestures. Similarly, when a MAT-SC/MG-SC was the target gesture, the video showed the competitor MAT-FC/MG-FC as well as two unrelated gestures. The participants were divided in two groups differing only with respect to the stories testing MAT and MG. Each participant saw 10 videos. In addition to the 8 videos targeting unrelated gestures, the first group was shown (i) one video where the target was MAT-FC and in which they also saw MAT-SC and (ii) one video where the target was MG-SC and in which they also saw the competitor MG-FC. The second group was shown (i) one video where the target was MAT-SC and in which they also saw MAT-FC and (ii) one video where the target was MG-FC and in which they also saw the competitor MG-SC. Thus, each participant saw all four relevant gestures: MAT-FC, MAT-SC, MG-FC, MG-SC. Below, I provide the content of two of the relevant videos.

(1) Target gesture: MAT-FC
   a. Text: Maria was invited to play at a friend's house. The friend's family knows that Maria is allergic to chocolate. However, Maria's mother sees her come back holding a chocolate bar in her hand and with chocolate stains around her mouth. Maria's mother is mad and asks:
   b. Ma chi ti ha dato quella barretta? (biased utterance)
      But who has given you that bar
      Who gave you that chocolate bar?
   c. Sequence of 4 gestures:
      1: *Basta* ('enough') gesture (unrelated); 2: MAT-SC (competitor); 3: *Smamma* ('go away') gesture (unrelated); 4: MAT-FC (target)

(2) Target gesture: MAT-SC
   a. Text: Elisa is talking with Anna about Elisa's chances of landing an academic job immediately after completing her Ph.D. Elisa is having a lot of trouble publishing. Anna tells her that someone will hire her.
   b. Ma chi mi assumerà? (rhetorical utterance)
      But who me will-hire
      Who will hire me?
   c. Sequence of 4 gestures:
      1: MAT-SC (target); 2: *parere personale* ('it's just my personal opinion') gesture (unrelated); 3: MAT-FC (competitor); 4: *basta* ('enough') gesture (unrelated)

The results are shown in Figure 4 for MAT and Figure 5 for MG.

Both Figure 4 and Figure 5 combine (a) both groups and (b) both biased and rhetorical

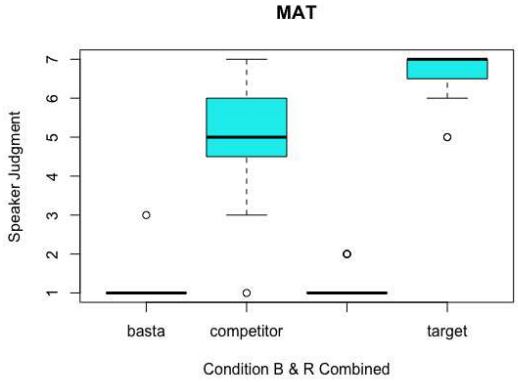


Figure 3: Results for MAT, both groups combined

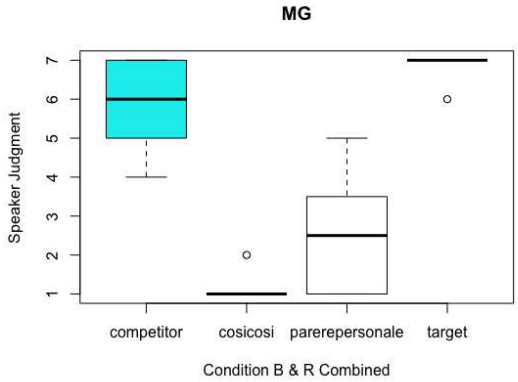


Figure 4: Results for MG, both groups combined

condition.[3] Figure 4 shows that the target MAT was preferred to its competitor (MAT with a different tempo contour); the unrelated gestures were considerably lower than both target and competitor. For example, in information-seeking/biased contexts, the target MAT-FC was preferred to its competitor MAT-SC; in rhetorical contexts, MAT-SC (target) was preferred to MAT-FC (competitor). Figure 5 shows the same results for MG.

2.2 Part II: forced choice

We collected the judgments of a large body of participants (98 undergraduate students at the University of Milan, Bicocca), divided in two groups. Participants read a text ending with a character making a gesture, and subsequently saw two videos, one showing the character performing a slow contour pro-speech gesture, and the other showing the character performing the same gesture but with a fast contour. Participants had to choose the one gesture that they

[3]In Figure 3, the column corresponding to the second unrelated gesture has not been labeled because, as the reader can see in (1) and (2), this gesture was different in the two videos (*smamma* and *parere personale*).

thought was more natural in the given context. Each participant saw two contexts: one for MAT and one for MG. In the end each participant saw all four relevant gestures once: MAT-SC, MAT-FC, MG-SC, MG-FC. The participants were divided in two groups: group A had 56 participants and group B had 42 participants. Group A was shown (i) a biased context with a choice between MAT-FC and MAT-SC, and (ii) a rhetorical context with a choice between MG-FC and MG-SC. Group B was shown (i) a rhetorical context with a choice between MAT-FC and MAT-SC, and (ii) a biased context with a choice between MG-FC and MG-SC. The rhetorical and biased contexts for the two groups were different. The results are shown in Figure 5.

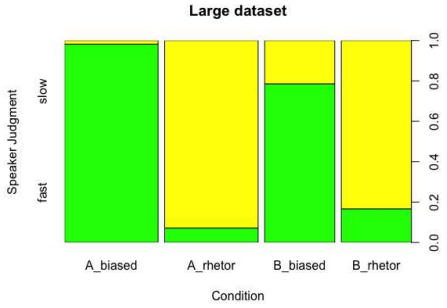


Figure 5: Results for Forced choice task, groups A and B

Group A's accuracy was 98% in the biased context and 92% in the rhetorical context. Group's B accuracy was 78% in the biased context and 83% in the rhetorical context. These results too support our hypothesis: the fast contour is strongly preferred in biased/information-seeking contexts, whereas slow contour is strongly preferred in rhetorical contexts.[4]

3 Semantics

In this section I focus on the semantics of MAT. In proposing a semantics for MAT in biased and rhetorical questions, there are at least three components of the gesture that might in principle contribute to its meaning: static MAT (that hand in the tulip configuration), movement, and tempo. The goal of the analysis I will sketch in this section is to capture the following points. First, MAT is a *wh*-operator: if MAT is a co-speech gesture, then there is also an overt constituent question (with an overt *wh*-word); if MAT is a pro-speech gesture, then the remainder of the question is covert. Second, movement indicates the divergence from some of the assumptions that characterize canonical, standard questions. In particular, movement with a fast (or, maybe more accurately, non-slow) tempo indicates *speaker*'s bias towards the answer to the question: i.e. it indicates that the speaker believes that no positive answer to the

[4]There was an asymmetry between group A and group B in the way these judgments were collected. The participants in group A saw the MAT and MG contexts as part of a larger forced-choice task about gestures (which was part of a different study); the participants in the B group only saw the MAT and MG contexts I designed to check my hypothesis. Since the accuracy scores for the B group are lower than the scores for the A group, one might hypothesize that the higher accuracy in the A group is the result of a priming effect. Alternatively, the two groups read different scenarios and chose the gestude they thought was appropriate in the scenarios they saw. It is conceivable that this different might at least have contributed to the different degrees of accuracy we saw.

question is true. Movement with a slow tempo, on the other hand, indicates both *speaker and addressee*'s bias with respect to the question: more specifically, it indicates that the speaker believes that speaker and addressee share the same bias towards the answer to the question.

There are different ways to formalize these ideas. For example, with respect to the bias, one can formalize this idea more traditionally as a presupposition and as such closely linked to the compositional semantics of the question, or one can treat it as a conventional discourse effect – along the lines proposed by [7] and [6] – and as such as independent of the semantics. For convenience, here I will choose the presupposition analysis. A second issue that becomes important in formalizing these ides is how one should understand the relation between MAT and movement. One possibility is that what we have described above is a complex structure formed by a static gesture (the hand in the tulip configuration) together with movement, which itself can be fast or slow. A different possibility is that there is no static gesture and that the basic non-decomposable unit is given by the moving MAT. In this scenario, the two different variants are given simply by slowing down the default tempo of the gesture: in this scenario, what we are calling the 'fast contour' is simply the default tempo contour of the gesture. If one represents tempo as a feature, then the question is whether we should formalize these two tempos as two independent features [fast] and [slow] that can combine with a static MAT, or whether we should only have the [slow] feature and represent the 'fast' tempo as the absence of [slow], i.e. as a kind of default tempo. Since I do not have the space here to argue for these points, I will proceed by making some assumptions with the caveat that, as long as they capture the main ideas that I am proposing, different formalizations can be considered, explored, and possibly adopted.

In order to simplify exposition, I will make the following assumptions. First, the gesture MAT (the hand in the tulip configuration) is essentially characterized by movement and it denotes a non-canonical *wh*-operator, i.e. a *wh*-operator carrying the speaker's presupposition (bias) that the speaker believes that no proposition in the denotation of the question is true. I will refer to this gesture at MAT_{MVT}.[5] Second, a feature [slow] can combines with MAT_{MVT}. If [slow] is not there, then we have what we called the 'fast contour', which now we understand to be a default/non-slow contour: this has the meaning of the biased MAT question. If, on the other hand, the feature [slow] is there, then we have what we called the 'slow contour': [slow] adds the presupposition that the speaker believes that the *addressee* shares the speaker's bias with respect to the answer to the question. A MAT_{MVT} marked with [slow] is interpreted as a rhetorical MAT question. Note that in this picture, what makes MAT a rhetorical question is not that the answer is part of the common ground but that it presupposes that both speaker and addressees agree on the answer.[6] I will assume that the denotation of a question is the set of possible answers and I will make the simplifying assumption that the *wh* operator combines with the open proposition P (of type <et>) in its complement and creates a set of propositions p where p is obtained by combining P with x, for every x in a relevant set of entities. The contextual parameter c includes a set A of salient entities, which are crucial in the construction of the propositions in the denotation of the question, and the set of discourse participants DP, which includes speaker s and addressee a.

(3) $[\![[\text{MAT}_{\text{MVT}}\ \text{P}]\!]^c$ defined if for every $x \in A_c, DOX_{s \in DP_c} \cap P(x) = \emptyset$; if defined, $[\![\text{MAT}_{\text{MVT}}\ \text{P}]\!]^c = \{p : p = P(x) | x \in A_c\}$

[5] Our main reason for not having an interrogative *static* MAT is that the latter does not seem be a possible geature for Italian speakers. There is evidence that MAT occurs in LIS (Lingua Italiana dei Segni, 'Italian sign language') as well, as discussed in [2] and that too seems to be characterize by movement. An investigation of the features and semantics of MAT in LIS is lacking, a gap to be addressed in the future.

[6] This makes the current proposal closer to [1] than [3].

This speaker's presupposition is carried by MAT_{MVT} itself. [slow] introduces the additional presupposition that all discourse participants in DP *agree* which respect to the answer to the question that is being asked, where I assume that to agree with respect to a proposition is to have the same doxastic attitude towards that proposition. Thus, I take it that to agree with respect to the answer to a question means to have the same doxastic attitude towards all the propositions in the denotation of the question. Compositionally, I take [slow] to be an identity function applying to MAT_{MVT} and adding the presupposition that for every discourse participant d and d', d has the same doxastic state as d' with respect to each proposition in the denotation of the question; that is, d and d' agree with respect to the answer to the question. This is shown in (4).

(4) $[\![\text{slow}]\!]^c = \lambda Q_{<st,t>}$: for every $p \in Q$ and for every $d, d' \in DP_c$, d has the same doxastic attitude as d' with respect to p. Q

When applied to a MAT question, we obtain the semantics in (5).

(5) $[\![[\text{slow}]\ \text{MAT}_{\text{MVT}}\ \text{P}]\!]^c$ defined if for every $p \in [\![\ \text{MAT}_{\text{MVT}}\ \text{P}]\!]^c$ and for every $d, d' \in DP_c$: d has the same doxastic attitude at d' towards p; if defined, $[\![[\text{slow}]\text{MAT}_{\text{MVT}}\ \text{P}]\!]^c = \{p : p = P(x) | x \in A_c\}$

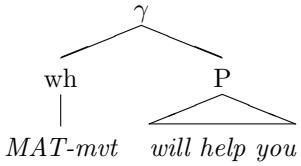
Since [slow] applies to a MAT_{MVT}-question, requiring that speaker and addressee agree with respect to the answer to the question amounts to requiring that the speaker and addressee share the same bias towards the answer to the question.

As an illustration, consider the interrogative utterance in (6) accompanied by co-speech MAT-FC. The first line approximates the timing of gesture execution: the formation of the tulip hand overlaps with the utterance of the interrogative pronoun *chi*, 'who'; the succession of wedges (∧) is used to describe the trill, which begins immediately after the tulip is formed and continues until the end of the utterance.

(6) MAT-FC∧∧∧∧∧∧
Chi ti aiuterà?
Who will help you?

In the following diagram, the elements that contribute to the semantics of the gesture in relation to the utterance are hierarchically arranged. MAT_{MVT} duplicates the *wh*-word and adds the speaker's presupposition in (3).

(7)



The dialogue in (8) illustrates an occurrence of pro-speech MAT.

(8) A: Qualcuno mi aiuterà.
Someone me will-help
Someone will help me.
B: **MAT**-FC∧∧∧∧∧∧

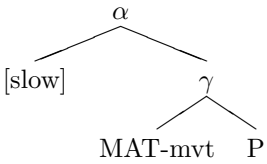
In this case, part of the question is covert: the interrogative pronoun is contributed by MAT_{MVT} and the open proposition [λx. x will help you] is made salient by the previous utterance. More

specifically, in this case P in (7) is a covert variable indexed in such a way as to be assigned as its value the predicate [$\lambda x.$ x will help you] made salient by the previous utterance. The complete meaning of B's gesture is equivalent to the meaning of (6).

To recap our proposal so far: (i) MAT_{MVT} has the semantics of a non-canonical *wh* interrogative pronoun; (ii) MAT_{MVT} is non-canonical in that it introduces the bias that the speaker believes all answers to the question to be false; (iii) speaker's bias was modelled as a presupposition; (iv) the bias of the speaker (only) is characterized by what we labelled the 'fast' contour. A MAT-FC question is felicitous in a situation in which there is doxastic conflict between the discourse participants: in (6) and (8), for example, the speaker is at the same time asking a question whether someone will help A and presupposing that she believes that nobody will help A. This must be because the speaker has been given (e.g. by the addressee's asserting that someone will help her) some evidence against what she believes is the answer to the question, and is now trying to resolve this situation of doxastic conflict.

The diagram in (9) shows the structure when movement is marked by the feature [slow].

(9)



Given the meaning for [slow] we established in (4), the presupposition introduced by MAT_{MVT} is attributed to all the discourse participants. For example, in the slow contour version of (8) – shown below in (10) – every discourse participant is required to believe that nobody will help A.

(10) A: Qualcuno mi aiuterà.
Someone me will-help
Someone will help me.
B: MAT-SC∧∧∧∧∧∧

Unlike the biased case, the speaker is now presupposing that there is 'doxastic harmony' between her and the addressee in that they both share the speaker's bias about the answer to the question. This doxastic harmony with respect to a bias about the answer to a question is, I claim, the feature of a rhetorical question.

4 Conclusion

MAT can occur as a co-speech and pro-speech gesture. Previous descriptive literature has observed that it occurs in non-canonical interrogative sentences, i.e. interrogatives denoting questions where one of the canonical assumptions about questions has been abandoned. In this paper I have argued that both co-speech and pro-speech MAT have the semantics of a non-canonical *wh*. MAT_{MVT} by itself brings about a 'speaker bias' interpretation – this is what we labeled the 'fast contour', which we now understand to be the unmarked tempo of the gesture. When the feature [slow] is added, the bias introduced by MAT_{MVT} is generalized to all discourse participant: the doxastic harmony imposed by [slow] is the source of the rhetorical interpretation of the question (all discourse participants agree about the answer to the question). I did not have space to analyze the semantics of MG in this paper. However, given the results of the tests I have reported above, my hypothesis is that MG_{MVT} has a non-canonical interrogative meaning and carries a 'speaker bias' presupposition of the kind introduced above; modification

by [slow] in this case too will introduce a 'doxastic harmony' that will give rise to the rhetorical interpretation.

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