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## **“Pears are big green”: gestures with concrete objects**

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### **Abstract**

The paper examines hand gestures when referring to inanimate referents. The aim of the study was to explore which factors determine the features of a gesture within the framework of modes of representation. Four main types of modes of representation were considered: drawing or shaping the form of the referent, acting, pointing, and presentation (PUOH); in addition, a new category of beat gestures was added.

As a result, it was shown that communicative dynamism or other referent characteristics such as control of the object or its inferability from the previous context do not fully determine the use of gestures with the referent. As an alternative hypothesis, we propose a notion of gesture information hierarchy, where discursive factors, such as previous mentions of the referent and the introduction or change of the protagonist along with the way an object is used determines the form of the gesture.

**Keywords:** gesticulation, reference, monologue, narration

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## **«Груши большие, зеленые»: жесты с конкретными референтами**

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### **Аннотация**

В статье рассматриваются жесты рук при описании одушевленных и неодушевленных референтов. Целью исследования было изучить, какие факторы определяют особенности жеста, с учетом модусов репрезентации, предложенных К. Мюллер. Были рассмотрены четыре модуса репрезентации: обозначение контура или формы референта, действие и репрезентация; кроме того, была добавлена новая категория (жестовые ударения или биты).

В результате было показано, что коммуникативный динамизм или другие характеристики референта, такие как контроль над объектом или выводимость из предыдущего контекста, не вполне объясняют использование жестов с этим референтом. В качестве альтернативной гипотезы мы предлагаем идею информационной иерархии жестов, где дискурсивные факторы, такие как предыдущие упоминания референта, введение или изменение протагониста, а также способ использования объекта определяют форму жеста.

**Ключевые слова:** жестикуляция, референция, монолог, рассказ

## **1 Credits**

Annotations of manual gestures in the RUPLEX corpus were made by A. Litvinenko and Y. Nikolaeva; vocal annotations were made by V. Podlesskaya and N. Korotaev.

## 2 Introduction

Co-speech Gesticulation is closely related to the content of speech and its context in general. Gestures represent the same communicative intention as words, so in gestures we can see realizations of the grammatical, semantic, and pragmatic meanings of corresponding words.

We used the RUPLEX corpus [1] to study how animated and unanimated referents are illustrated with gestures, taking into account the referent's activation and how it is maintained throughout the narration. Six monologues (a total of 30 minutes) were analyzed, considering if it was the first or subsequent mention, the gesture type (if there was any), and episode boundaries. The aim of the study was to test the claim that first mentions of referents are more often accompanied by gestures, and these are C-VPT gestures.

## 3 Gesticulation, modes of representation and characteristics of a referent

According to McNeill [2, 3], the presence of gestures with a specific referent is determined by communicative dynamism, which is defined as the degree to which the information “pushes the communication forward” [4]. McNeill connects communicative dynamism to information status: the less accessible the information, the more probable a gesture with it is. Higher communicative dynamism also makes C-VPT (character viewpoint) gestures more probable. In contrast, there is other data showing that gestures tend to accompany referents that are reintroduced [5] or inferable from the preceding context [6] rather than first mentioned. Additionally, different gesture types can appear with different types of referents [7]: gestures with redundant information occurred with new referents, while non-redundant gestures occurred with already mentioned entities.

Also, McNeill [8] predicts, that “an absence of gesture is expected if there is a memory failure or its opposite, a complete predictability of the next step in discourse.”

Considering these different results, it seems reasonable to consider different types of gestures. In [9], C. Müller discusses four modes of representation: drawing, molding, acting, and representing. They are combined into two groups: acting and representing. The first group of gestures depicts the actions of a protagonist, with the object being illustrated in gestures; the second group describes the form of the object. The first group is related to the character point of view (C-VPT), i.e., the gesturer acts as a character in his story; the second group is related to the observer point of view (O-VPT), i.e., the gesturer acts as an observer in relation to the events being described. Some authors suggest that the choice of point of view depends on the degree of activation of the referent in the narration. Thus, depending on the context, speakers can be expected to favor the first or second group of gesture modes.

Ortega and Özyürek [10] mention another aspect of gestural iconicity related to pantomime or pre-sonification. They noticed that this modus is used for animate objects; for controlled inanimate objects, the speakers chose action gestures, and for uncontrolled ones, drawing gestures. So, for the same clause, we can expect three different types of gestures depending on the speaker's mental representation and profiling of one of the few referents mentioned in the clause.

In sum, there are a few contradicting claims connecting the first or subsequent mentions of a referent (with the first mention, gestures in general are more probable) and the point of view or modus of representation (C-VPT gestures that relate to acting gestures in Müller's classification are more expected with the first mentioned referents, if we accept McNeill's perspective, or with controllable objects following Ortega and Özyürek).

Chu and Kita [11] found that speakers were more likely to produce speech-related gestures when the objects they saw triggered the action than when they did not. It is similar to the notion of control in [10], but makes the idea of how the object can be held more prominent. Another object feature can be its familiarity: if the speaker assumes that the addressee is unfamiliar with the object (for example, a toy with a ball tied to it), they may more often use a gesture with it [12].

## 4 Method

In this study based on “The Pear Story” retellings we used six monologues from the RUPLEX corpus (recordings #04, #22, #23) to study gestures with all animate and inanimate referents (pears, bicycle, hat, baskets, apron, tie, pants, the girl's braids). Other inanimate referents were not added to the list

because they were rare and less often accompanied by gestures. We chose only the EDUs<sup>1</sup> that belonged to the main line of the story; if it was accompanied by a gesture, we marked the gesture type accordingly to the following procedure.

The RUPLEX corpus divides gesture functions into four types: depictive, pointing, pragmatic, and beats, based on their formal characteristics, connection to speech and semantic features [13]. Beats are gestures with a simple form (usually realized through short up and down movement); they are supposed to highlight the corresponding fragment of speech, similar to the phrasal accent [14]. Pointing gestures have a typical form and convey information about the location of an object in the gesture space around the speaker. They are used to activate and reactivate the referent in the narrative. Depictive gestures are the most complex in form; they convey visual-spatial meanings and characterize the shape, movement, and mutual arrangement of objects. Depictive (representational) gestures are especially interesting for linguists since the complexity of their formal features makes it possible to study the relationships with different characteristics of speech, such as aspectuality, plurality, referent activation, etc. The fourth type is pragmatic gestures. They are characterized by a recognizable (partly emblemized) form and are associated not with the content of the story, but with the speaker's stance in relation to the events described, interaction between the interlocutors, discourse structure, etc.

For this study we reanalysed the classification and divided depictive gestures into two types: describing the form of the referent (O-VPT; molding or drawing gesture in [15]) or the character's actions (C-VPT; acting gesture in [15]). As for pragmatics, most of them are PUOH in Müller's approach [16] or conduit metaphors in [2]; they were regarded as representing gestures in this study. There were few types of other pragmatics in the corpus and they were classified as beats based on their form (short downward movement coordinated with prosody). Thus, there were the following types of gestures:

1. beats (not mentioned in [15]),
2. representing (or pragmatic in [13]),
3. pointing and
4. iconic-OVPT (tracing in [15]),
5. iconic-CVPT (acting in [15]).

In the second part of our study, we organized gestures into three general types: gestures of presentation (1 and 2), gestures of form and position (3 and 4), and gestures of action (5).

for referents in the stories we noted for each EDU:

A. for animate referents:

1. the first and then
2. the second mention of a character,
3. the change of the protagonist (character reactivation),
4. subsequent references to a character.

B. for inanimate referents:

1. the first and then
2. the second mentioning of an inanimate referent from the list above,
3. subsequent references to the referent,
4. the absence of inanimate referents in the clause.

This study used a verbal transcription that assumes a very detailed division into EDUs, in which there were many cases of ellipsis and parcellation (splitting a syntactic clause into two or more EDUs), so we noted the animate referent even in those EDUs where it was not named explicitly, while for the episode the protagonist was retained. Additionally, we marked the cases where two animate referents were mentioned in one EDU.

## 5 Results

### 5.1 Communicative dynamism for referents and their gesture illustrations

In total, there were 763 EDUs related to the main line of the story

First, we tested the claim that new referents in an episode attract gestures in general or C-VPT gestures, Table 1 and Figures 1 and 2 present the results.

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<sup>1</sup> Elementary discourse unit, defined primarily on the basis of prosodic criteria

EDU contained	No gesture	Beat	Representing	Pointing	Iconic-OVPT	Iconic-CVPT	Total
First mention of a character	22	0	2	1	1	2	28
Reintroduction of a character	57	1	3	3	4	9	77
Second mention of a character	18	0	3	1	3	3	28
Other mentions of a character	222	11	26	21	67	171	518
Two characters	38	0	0	1	1	11	51
Last mention of a character in the episode	43	3	2	2	1	9	60
First mention of an object	29	0	4	2	24	20	79
Second mention of an object	12	2	4	1	13	7	39
Other mentions of an object	86	9	20	23	30	159	327
No object	273	4	8	3	10	19	317

Table 1: Animate and inanimate referents with gestures

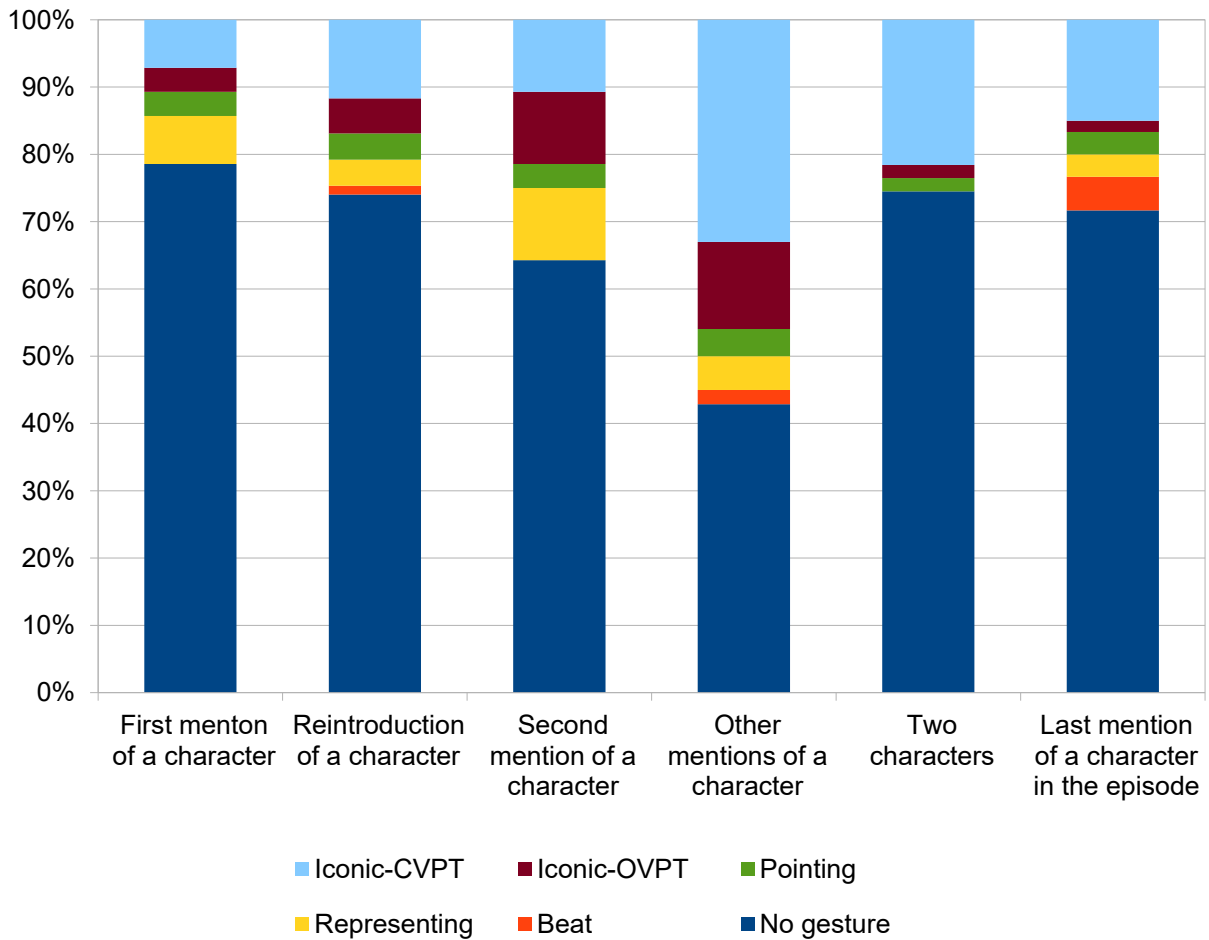


Figure 1: Animate referents with gestures

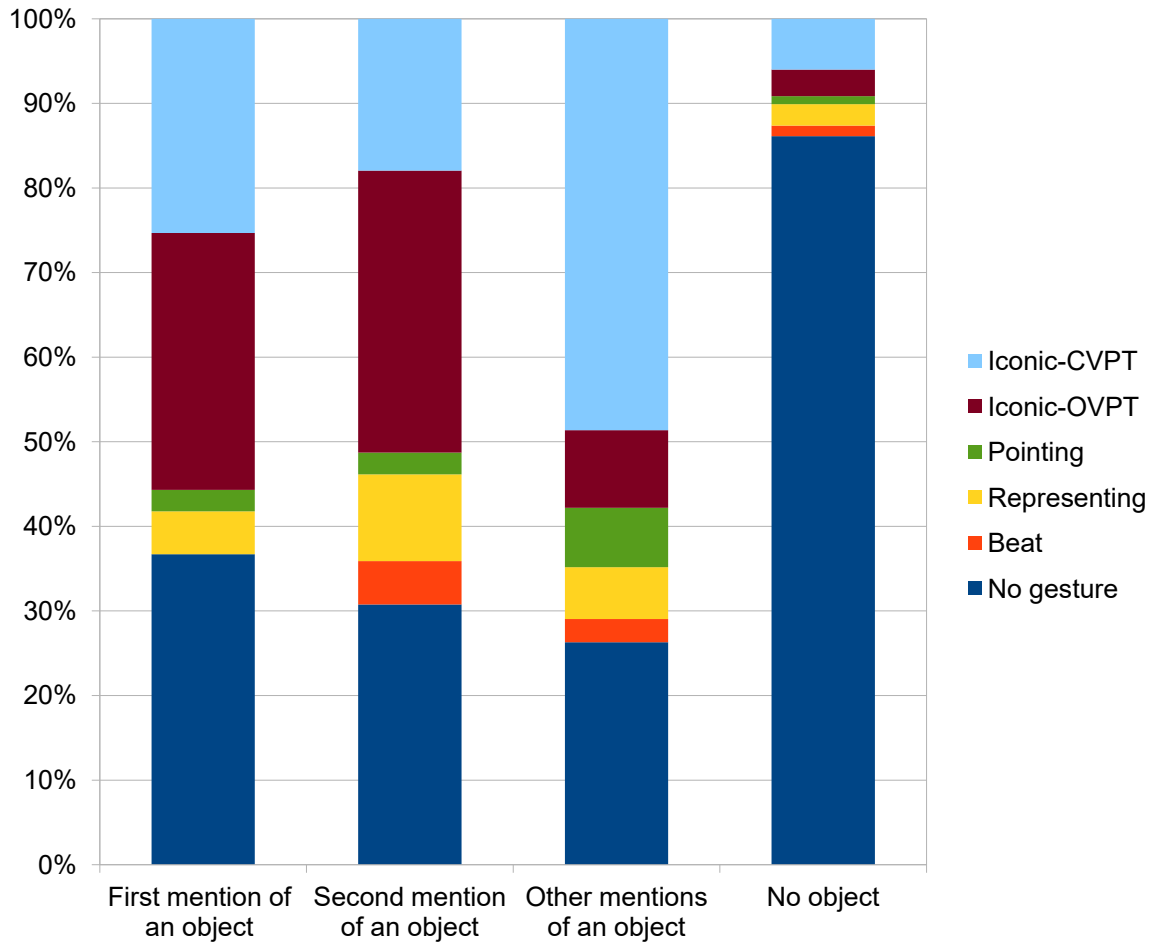


Figure 2: Inanimate referents with gestures

As shown in Table 1 and Figures 1 and 2, neither first nor second mention of a referent is more often accompanied with gestures. It contradicts the assumptions in [2, 3]. For animate referents, it is much more probable to see it with a gesture in the middle of the episode. Additionally, EDUs with inanimate referents are more often illustrated with gestures, than those without them, but there is still a tendency for central EDUs in the episode to be combined with gestures.

## 5.2 Hierarchy of gesture information within an episode

We supposed that position within the episode (but not the order of mentions) determines the type of accompanying gesture.

We propose a hierarchy of gestural activation according to the growth point hypothesis [17]. We suppose that verbal and gestural descriptions of a referent unfold in parallel, and we can expect gestural means of tracing a referent to be elaborated and differentiated along with verbal ones, but not necessarily in the same way. In this part of the research, we tested the hypothesis of gestural activation:

1. For the first gestural illustration of the protagonist, the speakers use gestures of presentation. They signal the importance or novelty of the simultaneously mentioned referent.
2. Gestures of form and position continue the gestural description of already introduced referents and add information about their appearance and/or position relative to other referents.
3. Action gestures are used to describe the protagonist's actions related to the main line.

4. Beats can mark episode boundaries too, but at the end of the episode (unlike gestures of presentation, which appear at its beginning). In our corpus, one of the speakers (04N) used 3 of the 13 beats at the last EDU of the episode.

There is a claim behind this approach, supposing that the gestural track has been maintained since the character is first named in the story.

All gestures can appear not with the first EDU but later, and at every of the three first stages of the referent description there can be more than one gesture of a particular type.

We tested the hypothesis with first mentions opposed to subsequent ones for animated referents. We checked which general gesture type was the first in two types of episodes: when the character is first mentioned in the narration and when he or she is reintroduced after an episode boundary (see Table 2).

	Presentation Form and position Action		
First gestural illustration of a character	6	10	7
Gestural illustration after reintroduction of a character	7	12	21

Table 2: Gesture general type and their appearance within the episode

In fact, the choice of a gesture to start the story was more complex: in 4 of the 6 monologues examined, the very first gesture was of action. This might be due to the stimulus material for the story: the film begins with a close-up showing the hands of the gardener, who picks up pears and puts them in his apron. This movement was the first gesture in four of six subjects.

Figure 1 shows that with the first and even more often with the second mention of a referent the probability of a gesture of representation slightly grows, that can be interpreted as an indirect support for our claim.

## 6 Discussion

The choice of a particular form of depictive gesture when describing an inanimate referent is largely determined by its appearance and the way it is used. However, a preliminary analysis has already shown that other factors may influence the proposed scheme. The speaker uses gestures to consistently inform the addressee of the appearance of a new referent, its external features and the character's actions with the presented object.

At the same time, gestures reflect the history of previous references and sometimes signal an upcoming boundary of the episode.

Our findings do not support the idea that first mentions, inferability of a referent or other referent's features directly influence the use of gestures, but we suppose that communicative dynamism can be a reason for gestures to be used, although the most dynamic clauses seem to be in the middle of an episode rather than in its beginning,

We distinguish three main modi of gestures as referential means in the narrative: the presentation of an object (announcing its existence, presentation or PUOH gestures); the description of the appearance of a character or object (iconic O-VPT); the position of the referent relative to the characters already mentioned (deictics); and iconic C-VPT which are related to actions of characters in the story. We partly support the idea that the modus of the gesture is determined by the ability to use the object, but we believe that along with this there is a procedure of 'introducing' the object, where first there will be either an indication of its existence or location, or a description of its properties and/or form, and this description can be quite extensive (more than one EDU and more than one gesture).

These observations, of course, only apply to a particular genre: the narration, an extended, coherent story about events in the real world. Other genres and types of discourse suggest different gestures use.

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