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To cite this article: Chiara Dal Farra, Aurore Gonzalez, Silvia Silleresi, Desiré Carioti & Maria Teresa Guasti (2026) *Sì* and *no*: How Italian children and adults answer positive and negative polar questions, *Language Acquisition*, 33:3, 435-469, DOI: [10.1080/10489223.2025.2562194](https://doi.org/10.1080/10489223.2025.2562194)

To link to this article: <https://doi.org/10.1080/10489223.2025.2562194>



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Sì and *no*: How Italian children and adults answer positive and negative polar questions

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ABSTRACT

There is cross-linguistic variation in the strategies languages use to answer polar questions. Specifically, languages differ in the type of answers that can be produced: only a response particle, only a continuation, or a combination of both. Among languages that allow response particles, there is further variation in how these are used to answer negative polar questions. In Positive-Negative languages, which Italian has been claimed to belong to, positive response particles are used to express positive polarity, whereas negative response particles mainly express negative polarity. This article experimentally investigates these two aspects of answers to polar questions in adult and child Italian. We do so by eliciting answers to both positive and negative polar questions and analyzing the type of answers that were given and their form. To our knowledge, this is the first study investigating the answering system in both positive and negative polar questions in adult and child Italian. Our results from adults suggest that Italian is mostly, but not strictly, a Positive-Negative language. In addition, we show that 4- to 5-year-old Italian children are able to answer positive and negative polar questions, behaving in line with adults, although they have yet to fully acquire the ability to produce mandatory continuations in certain contexts. Lastly, as a corollary result, we show that our data experimentally support the validity of the markedness scale in adult and child Italian: some responses are more marked than others and are mapped to more specialized forms.

ARTICLE HISTORY

Received 10 September 2024
Accepted 9 September 2025

1 Introduction

Polar questions (sometimes also called *yes-no* questions) are questions that can be answered with response particles (RPs) like *yes* and *no* in English. They contrast with content questions (or *wh*-questions), which involve a *wh*-phrase and require as an answer a constituent that corresponds to the *wh*-phrase in the question. An example of both types of questions together with a possible answer is provided below.

- (1) a. Did Zoe write the paper?
Yes.
- b. Who wrote the paper?
Zoe.

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 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/10489223.2025.2562194>

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Across languages, polar questions are not always answered using an RP only, as in (1a) (see, e.g., Leslau 1962, Sadock & Zwicky 1985, Yaisomanang 2012, González-Fuente et al. 2015, Holmberg 2015, Li et al. 2016, Enfield et al. 2019, Gonzalez et al. 2019, Esipova 2021, and references therein). In particular, in a language like Italian, answers to polar question can be composed of two parts: (i) an *RP*, as in (2a), optionally co-occurring with (ii) a *continuation* (namely, a clause following the RP).¹ We will call answers such as (2b), which involve both an RP and a continuation, *complete* answers.² We provide a glossary at the end of the paper (see pp. 33),

(2) *Zoe ha scritto l'articolo?*

Zoe have.3SG written the=paper

‘Did Zoe write the paper?’

a. *Sì.*

RP

yes

‘Yes.’

b. *Sì, l'ha scritto.*

Complete

yes it=have.3SG written

‘Yes, she wrote it.’

In this paper we explore how adults and children respond to positive and negative polar questions in Italian. Positive and negative polar questions both raise the same issue of choosing between a proposition and its negation. However, previous work has shown that they are not equally appropriate in any given situation. Specifically, they convey different information on what the speaker’s belief is with respect to the proposition and what evidence has become available to the participants in the discourse (Ladd 1981, Buring & Gunlogson 2000, Romero & Han 2004, Roelofsen et al. 2012, Domaneschi et al. 2017, among many others). We analyze the types of answers provided by adults and children to both positive and negative questions in relation to the description of the Italian answering system previously reported in the literature. To our knowledge, this is the first study investigating the answering of both positive and negative polar questions in adult and child Italian. On the empirical side, it examines the types of answers Italian-speaking children and adults produce and the RPs they use, hence shedding new light on the Italian answering system and its acquisition. On the theoretical side, it explores the principles that govern this answering system, combining insights from syntactic theory with Gricean conversational maxims.

¹For the sake of simplicity, we refer to these components using the distinct labels *RP* and *continuation*. Nonetheless, we are aware that, in previous literature, different labels have been used to refer to the same two components (*RP*: polarity particles, Andorno & Rosi 2015; answer particles, Sadock & Zwicky 1985; Holmberg 2015; bare response particles, Servidio et al. 2018; *continuation*: extra material, Andorno & Rosi 2015; additional information, Bernini 2001; elliptical sentence radical, Servidio et al. 2018; repetition, Rossano 2010; repetition-type answer, Enfield et al. 2019, among others). Our concern is not to take a position on this matter but to justify the use of a certain terminology for the specific purpose of the present work. Therefore, in Sections 1.3 and 1.4, we will report on previous research using the original terminology adopted in the papers, but we will also provide between parentheses the corresponding terminology adopted in the present work.

²As already noted in Servidio (2014), in Italian the continuation sentence can reprise all the arguments in the antecedent sentence, although it is generally more felicitous to substitute pronouns for full noun phrases (for both subjects and objects). For instance, in the example in (2), Italian allows for the full repetition of the antecedent sentence (*Sì, Zoe ha scritto l'articolo*. ‘Yes, Zoe has written the paper.’), but it is more natural to utter the continuation with subject pro-drop (*Sì, (pro) ha scritto l'articolo*. ‘Yes, (she) has written the paper.’), a clitic object (*Sì, Zoe l'ha scritto*. ‘Yes, Zoe has written it.’), or a combination of both, as reported in (2b). We considered all these variants acceptable as continuations, and this applies to the examples presented throughout the paper. The same reasoning, adjusted for the specific characteristics of each language, can be applied to the examples in English and Japanese that we provided in Table 1 and Table 2.

In what follows, we start by discussing the first component of these answers, namely, the RP (Section 1.1), and then turn to the continuation (Section 1.2). The remainder of the article is organized as follows: building on previous research, Section 1.3 outlines the pattern of the Italian answering system. Section 1.4 reviews previous studies on the acquisition of polar questions and answers to polar questions in children across languages. Section 2 details the aims and the methodology of the current study and is followed by the presentation of the results in Section 3. Finally, in Section 4 we discuss the findings of the present work in relation to previous research.

1.1 About the RP

Previous work has argued that across languages RPs are the morphological realizations of two types of polarity features (Pope 1972, Roelofsen & Farkas 2015): (i) absolute polarity and (ii) relative polarity. The first feature marks an answer as being positive or negative. The second feature encodes the relationship between the polarity of the answer and the polarity of its antecedent, in our case the polarity of the polar question that is being answered. Specifically, for agreeing answers the polarity of the answer matches the polarity of the question (either both are positive or both are negative), whereas for disagreeing answers it does not (one is positive and the other is negative). These two features can combine resulting in four logical combinations illustrated in Table 1, which have been called by Pope (1972) Positive Agreement (PA), Positive Disagreement (PD), Negative Agreement (NA), and Negative Disagreement (ND).

Languages vary in the way these features or feature combinations are realized. English, for instance, is traditionally described as a language whose RPs mainly encode the absolute polarity feature, with *yes* being used for positive (agreeing and disagreeing) answers and *no* being used for negative (agreeing and disagreeing) answers (Pope 1972, Sadock & Zwicky 1985), as shown in Table 1.³ In contrast, Japanese is often given as a characteristic example of a language whose RPs encode relative polarity, with the RP *hai* being used for agreeing (positive and negative) answers (i.e., PA and NA answers) and the RP *iie* for disagreeing (positive and negative) answers (i.e., PD and ND answers; Pope 1972, Kuno 1973, Sadock & Zwicky 1985, Yabushita 1998, among others) as illustrated in Table 2.

Languages like English have been called in the literature Positive-Negative (P-N) languages and languages like Japanese Agreement-Disagreement (A-D) languages.⁴ A recent classification of documented languages can be found in Holmberg (2015). As can be seen from Tables 1 and 2, both types of languages yield the same answering pattern for positive polar questions but can be distinguished on the basis of their answering pattern to negative polar questions.

Pope (1972) and Roelofsen and Farkas (2015) have further proposed that the four polarity feature combinations, namely, PA, PD, NA, and ND, differ in their semantic markedness. The more marked

Table 1: Polarity feature combinations: Absolute polarity (positive/negative) and relative polarity (agreement/disagreement).

	Agreement	Disagreement
Positive	Did Zoe write the paper? Yes , she did.	Did Zoe not write the paper? Yes , she did.
Negative	Did Zoe not write the paper? No , she didn't.	Did Zoe write the paper? No , she didn't.

³Note, however, that variation has been observed in the kind of RPs that can be used for PD answers. Specifically, as an alternative to RP *yes*, RP *no* can also be used (Kramer & Rawlins 2009, Kameyama 2013, Roelofsen & Farkas 2015, Goodhue & Wagner 2018, Maldonado & Culbertson 2023). That is, *no* seems to also be sensitive to the polarity of the preceding polar question. Holmberg (2015) and Maldonado and Culbertson (2023) (and references therein) further noted some cross-speaker variation in NA answers, where in addition to RP *no*, RP *yes* can be used by some speakers.

⁴An alternative terminology given to these two types of languages is ‘*polarity-based systems*’ for P-N languages and ‘*truth-based systems*’ for A-D languages (see, e.g., Jones 1999, Holmberg 2015).

Table 2: Japanese answering pattern.

	Agreement	Disagreement
Positive	Zoe wa ronbun-o kaki-mashita ka? Zoe TOP paper-ACC write-PAST Q 'Did Zoe write the paper?' Hai, kaki-mashita. yes write-PAST 'Yes, she did.'	Zoe wa ronbun-o kaki-masen-deshita ka? Zoe TOP paper-ACC write-neg-PAST Q 'Did Zoe not write the paper?' lie, kaki-mashita. no write-PAST 'No, she did.'
Negative	Zoe wa ronbun-o kaki-masen-deshita ka? Zoe TOP paper-ACC write-NEG-PAST Q 'Did Zoe not write the paper?' Hai, kaki-masen-deshita. yes write-NEG-PAST 'Yes, she didn't.'	Zoe wa ronbun-o kaki-mashita ka? Zoe TOP paper-ACC write-PAST Q 'Did Zoe write the paper?' lie, kaki-masen-deshita. no write-NEG-PAST 'No, she didn't.'

a feature or a feature combination is, the stronger the pressure is for it to be overtly and unambiguously realized. For instance, the specialized particle *si* in French can only be used to convey PD, the most marked feature combination. More specifically, Roelofsen and Farkas (2015) proposed the following markedness scale, where < indicates “less marked than.”

- (3) Positive Agreement < Negative Disagreement < Negative Agreement < Positive Disagreement

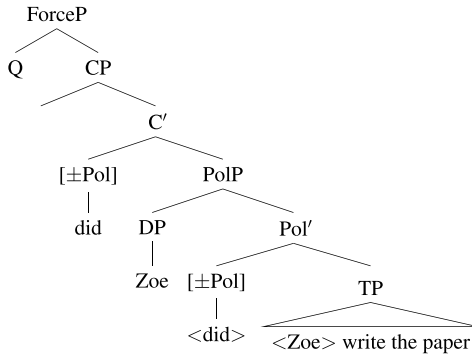
The markedness scale is based on three main claims. First, feature combinations whose absolute and relative features do not form natural classes are assumed to be more marked. Positive and Agreement, as well as Negative and Disagreement, naturally align, whereas Positive and Disagreement and Negative and Agreement do not. This results in an asymmetry between PA and ND, and NA and PD, with the former group being less marked than the latter group. Second, meanings involving negation or denial are known to be more marked than those involving affirmation (Horn 1989, Tian & Breheny 2016, among others). This derives the asymmetry between PA and ND, where the former is less marked than the latter. Finally, absolute polarity features in disagreeing responses are more marked because they contrast with the polarity of the preceding polar question. As a result, PD, which introduces a mismatch between a negative polar question and a positive response, is more marked than NA, where the response, just like the preceding polar question, is negative. The psychological validity of the markedness scale is supported by some recent studies on adult English speakers (Maldonado & Culbertson 2023) and on adult and child French speakers (Noveck et al. 2021). Having discussed RP, the next section will be devoted to discussing the other component of complete answers: the continuation.

1.2 About the continuation

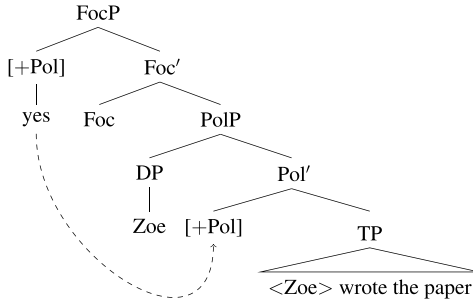
Answers to polar questions have been argued to involve full clauses that may be partly elided under identity with a constituent in the preceding polar question (Laka 1990, Kramer & Rawlins 2009, Authier 2013, Holmberg 2013, Servidio 2014, Holmberg 2015, Pasquereau 2020, among others). In particular, Holmberg (2015) has claimed that in languages like English, positive polar questions have the structure in (4). They involve a functional projection PolP (Polarity Phrase) in the inflectional field whose head is occupied by an unspecified polarity feature [$\pm$ Pol]. This [$\pm$ Pol]-feature undergoes movement to the C-domain for scope-related reasons. A Q-force feature contributes the illocutionary force of a root question: it requests the addressee to assign a value to the variable. Answers to positive polar questions, whether positive or negative, have the same PolP as the question, aside from the value of the polarity feature. In addition, answers, in contrast to questions, involve a focus projection where a valued polarity feature sits, [+Pol] in PA, as illustrated in (5a), and [−Pol] in ND, as illustrated in (5b). RPs spell out these focused polarity features. In English, for instance, *yes* realizes [+Pol] and *no* [−Pol]. These are operators that further assign a value to the

unvalued polarity feature in PolP, as illustrated in (5a)-(5b). Given that the PolP of the answers is identical to the PolP of the question (aside from the value of Pol), it can be entirely elided.⁵⁶ This derives responses made up of an RP only. This elision being optional, the PolP of the answers can also be entirely spelled out as a continuation. In that case, complete answers are derived.

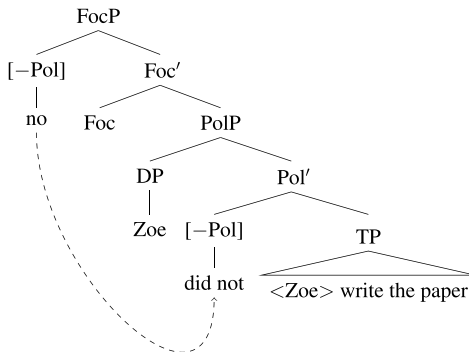
- (4) Did Zoe write the paper?



- (5) a. Yes, Zoe wrote the paper.



- b. No, Zoe didn't write the paper.

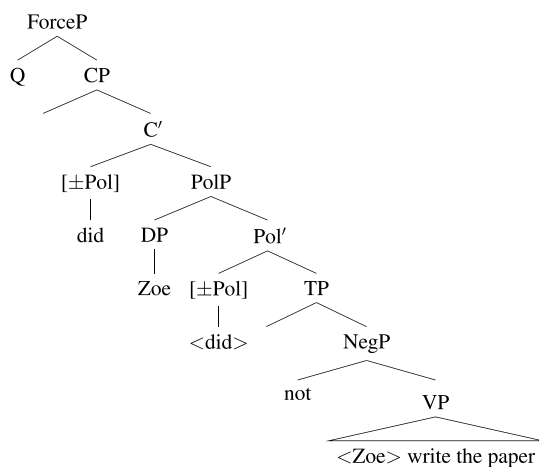


⁵It is not entirely clear how Holmberg (2013, 2015) derives the presence of the negative expression in ND responses. Given that a negation is not present in the question, it might be the case that the negative value of Pol triggers the realization of negation in the answer at PF. However, this is not explicitly spelled out in his analysis, leaving open the question of how exactly the expression of negation is derived in such cases.

⁶An anonymous reviewer, whose L1 is British English, pointed out that this is true in the case of PA answers, whereas in ND answers a continuation is actually required for clarity. The extent of variation among English speakers on this point deserves further investigation. Because this issue falls outside the scope of this paper, we leave it open for future research.

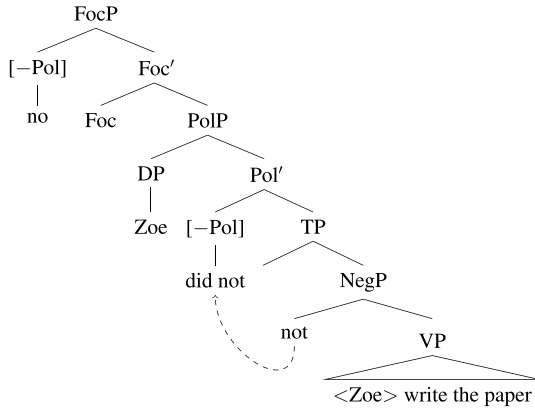
As can be seen in (6), negative polar questions have a structure identical to that of positive polar questions, aside from the presence of negation.⁷ Movement of the $[\pm\text{Pol}]$ -feature to the C-domain precludes valuation of the unvalued polarity feature by the negation. Answers to negative polar questions behave differently depending on whether they are negative or positive. On the one hand, in NA responses such as (7a), there are two different types of negation: the RP *no*, which is claimed to be inherently uninterpretable, and the interpretable negation contained in the continuation, in this case *not*. Because the RP is inherently uninterpretable, it cannot assign a value to PolP. Instead, this value is assigned by the negation in the continuation. RP *no* can, however, enter into a negative concord chain with that negation. Given that the PolP is identical to that of the question, the continuation can be elided, just like in positive polar questions, resulting in an RP-only answer. It is also an option not to elide it and hence to utter a complete response. On the other hand, PD responses such as (7b) are more complex. They involve a feature conflict between the negative value assigned by the negation (in the continuation, as it is inherited by the question) and the positive value assigned by the focused polarity feature. Here, an elided response is not an option: an RP-only answer implies that the PolP of the answer is identical to that of the question. However, because of the presence of the negative expression in the elided continuation, the PolP of the answer would be valued negative. Consequently, the affirmative operator in the answer would not have a variable to bind. This problem is avoided if what is elided in the answer is actually just the VP: the continuation no longer contains any negation, and the affirmative operator is free to assign affirmative value to Pol. As claimed by Holmberg (2015), a bare RP in this case has an indeterminate meaning. This, hence, leads to an ambiguous response. For instance, the answer ‘Yes’ to the question in (6) could mean either that Zoe wrote the paper or that she did not write it.

(6) Did Zoe not write the paper?

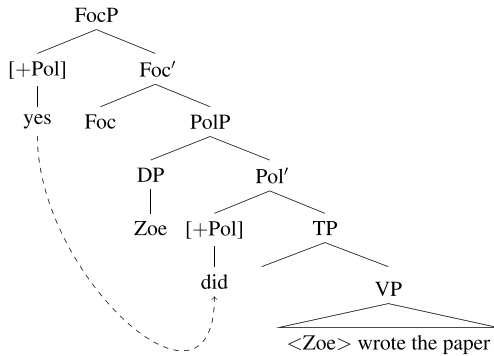


⁷Even though Holmberg (2015) relies on a three-way distinction of negation, we will focus on the negation that is relevant for this paper, namely, middle negation. Moreover, Holmberg (2015) does not take a position on whether negation is merged as a head or as the specifier of a null negative head. Because it is beyond the scope of the paper, we also avoid taking a position on the matter.

- (7) a. No, Zoe did not write the paper.



- b. Yes, Zoe wrote the paper.



Now that we have discussed the two components that make up answers to polar questions, we move to the description of the Italian answering system, which, as we will see in the next section, may require the use of RP or complete answers depending on the polarity feature combination we are in.

1.3 The Italian answering system

Italian, like English, has been described as a P-N language (Bernini 2001, Andorno & Rosi 2015, Servidio et al. 2018). In fact, the RPs used to answer polar questions encode absolute polarity: while *sì* 'yes' is dedicated to positive answers, *no* 'no' is used for negative ones. This is valid for answers to both positive and negative polar questions, as will be shown in the following examples. In positive polar questions, *sì* can only express positive polarity, as can be seen in (8a), and *no* negative polarity (8b). In this case, the speaker may utter an RP or a complete answer. The realization of the continuation is entirely optional. In other words, the PolP of the answer can be optionally elided.

(8) *Zoe ha scritto l'articolo?*

Zoe have.3SG written the=paper

'Did Zoe write the paper?'

a. *Sì (l'ha scritto).*

PA

yes (it=have.3SG written)

'Yes (she did).'

b. *No (non l'ha scritto).*

ND

no (not it=have.3SG written)

'No (she didn't).'

The answering system for negative polar questions is a bit more complex, but it still shows that Italian behaves as a P-N language. In fact, the answering pattern is sensitive to the polarity of the question and the RP *no* is dedicated to conveying either disagreement with a positive question (as we have shown in (8b)) or agreement with a negative question (in the case of (9b)). On the other hand, the RP *sì* expresses either agreement with a positive question (as shown in (8a)) or disagreement with a negative question (9a). Only in the latter must the answer be complete. A summary of the Italian system is provided in [Table 3](#).

(9) *Zoe non ha scritto l'articolo?*

Zoe not have.3SG written the=paper

'Did Zoe not write the paper?'

a. *Sì *(l'ha scritto).*

PD

yes it=have.3SG written

'Yes (she did).'

b. *No (non l'ha scritto).*

NA

no (not it=have.3SG written)

'No (she didn't).'

Table 3: Italian answering system strictly following the P-N pattern.

	Agreement	Disagreement
Positive	<i>Zoe ha scritto l'articolo?</i>	<i>Zoe non ha scritto l'articolo?</i>
	Zoe have.3SG written the=paper	Zoe not have.3SG written the=paper
	'Did Zoe write the paper?'	'Did Zoe not write the paper?'
	Sì , (l'ha scritto). Yes (it=have.3SG written) 'Yes, she did.'	Sì , *(l'ha scritto). Yes (it=have.3SG written) 'Yes, she did.'
Negative	<i>Zoe non ha scritto l'articolo?</i>	<i>Zoe ha scritto l'articolo?</i>
	Zoe not have.3SG written the=paper	Zoe have.3SG written the=paper
	'Did Zoe not write the paper?'	'Did Zoe write the paper?'
	No , (non l'ha scritto). No (not it=have.3SG written) 'No, she didn't.'	No , (non l'ha scritto). No (not it=have.3SG written) 'No, she didn't.'

We adopt Holmberg's (2015) analysis discussed in Section 1.2 to capture the Italian answering pattern described above. In the case of PA, ND, and NA answers, the continuation is optional because it is identical to the PolP of the immediately preceding question, whether positive or negative, apart from the value of Pol. In contrast, PD answers require a complete answer because uttering the RP alone leaves its meaning indeterminate, thus leading to an ambiguous response. Unlike English, Italian does not allow VP ellipsis (Cecchetto & Percus 2006). As a result, PD answers in Italian require not only the subject and auxiliary to be produced but the full continuation.

It is important to note, however, that some authors have claimed that the picture for NA and PD is not that simple. In his descriptive work on answers to polar questions in Italian, Bernini (2001) claims that in PD there can be variation in the type of RP that is used: Italian speakers sometimes also make use of *no*, as seen in (10a). In this case, the speaker may rely on prosody and/or on the use of additional particles: the RP is pronounced with a lengthened vowel and a higher, occasionally reiterated pitch tone, and it may also be accompanied by another particle *ma* 'but,' as in (10b).⁸ Moreover, Bernini discusses variation in the choice of RP for the NA pattern as well: not only *no* but also *sì* can be uttered, as seen in (10c). However, he states that the use of *sì* for the NA pattern is actually marginal.

(10) *Zoe non ha scritto l'articolo?*

Zoe not have.3SG written the=paper

'Did Zoe not write the paper?'

a. %*No* *(*l'ha scritto*).

PD

no (it=have.3SG written)

'No (she did).'

b. %*Ma no* *(*l'ha scritto*).

PD

but no (it=have.3SG written)

'But no (she did).'

c. ??*Sì* (*non l'ha scritto*).

NA

yes not it=have.3SG written

'Yes (she didn't).'

Experimental studies seem to confirm that adult Italian speakers follow the P-N system, while at the same time they show some variation in the way PD responses are conveyed.⁹ Answers to negative polar questions have been tested in Andorno and Rosi (2015), who elicited positive and negative answers to negative questions and assertions with two tasks: an Interview on participants' knowledge of foreign languages and a Map Task.¹⁰ Unfortunately, in reporting most of the results, the authors collapsed answers to negative questions and negative assertions. Only when

⁸Reiteration of the RP *no*, as in (i), is also a way used to correct speaker's assumptions. We thank an anonymous reviewer for pointing this out.

(i) %*No no*, *(*l'ha scritto*).

PD

no no (it=have.3SG written)

'No (she did).'

⁹We remind the reader that in this section and the following one, we report on previous research using the original terminology adopted in the papers, but we also provide between parentheses the corresponding terminology adopted in the present work, defined in the Glossary section at the end of the paper.

¹⁰In the Map Task the participant ('Giver') was given a map with a route marked on it, and the experimenter ('Follower') was given an unmarked map and had as the goal to reproduce the same route the Giver had. In order to do that, the Follower had to ask questions to the Giver regarding the route.

reporting results on the type of particles used in PD answers did they add both rates: questions and assertions either collapsed or separated. For consistency with the rest of their results, we here describe only those in which they are merged. The main results can be found in Table 4 and can be summarized as follows. Participants mostly used *si* and *no* as expected for a P-N language: in NA responses, only *no* was used (in 86% of the responses for the Map Task and 72% for the Interview). In PD responses, both RPs were found, even though *si* was the predominant one: in the Map Task, *si* appeared in 63% of the responses and *no* only in 7%. The rates changed in the Interview, with *si* found in 42% and *no* in 20% of the responses. The authors observed that this alternation even occurs within speakers. As expected, the encoding of PD was almost never restricted to the bare RP: participants produced expanded replies (*complete* responses). These were 88% in the Map Task and 98% in the Interview. In NA responses, on the other hand, they found lower percentages: 61% in the Map Task and 74% in the Interview. In the majority of these cases, the extra material (*continuation*) contained (at least) the verb and the object/clitic object. According to the authors, the use of expanded replies (*complete* responses) and the presence of RP variation in PD cases are to be considered results of the markedness phenomena, previously mentioned in Section 1.1 (see Farkas & Bruce 2009, Roelofsen & Farkas 2015). One last Interesting result to report from their study regards the omission of RPs (namely, examples containing *continuation* only), which has been found in both NA and PD responses and with similar rates across the tasks: in NA responses of the Map Task 12% and in the Interview 21% and in PD responses of the Map Task 21% and in the Interview 20%.

Servidio et al. (2018) also tested answers to polar questions, both positive and negative ones, but their focus was on the RP only. In fact, participants had to choose the answer in a two-alternative forced-choice task, where the only possibilities were either bare *si* or bare *no*. They manipulated the contexts in such a way that in half of them *p* was the case and in the other half *not p* was the case. Such contexts were called by the authors ‘state of affairs.’ Their results showed that for positive polar questions, participants always selected the RP expected for a P-N language: *no* was used to convey negative polarity and *si* positive polarity. For negative polar questions, *si* was used for PD and *no* for NA, again as expected for a P-N language.

To sum up, the existing theoretical and experimental literature on the answering system of (at least) adult Italian speakers suggests that Italian tends to behave as a P-N language but with some variation occurring in PD answers. Although some authors have also reported variation in NA answers, these claims are still marginal and not confirmed by experimental evidence.

Our goal for this work is to test experimentally all the possible response patterns and check whether the pattern reported in Table 3—the description of Italian as a strict P-N system—is valid. In this respect, we think that checking when complete answers are given and how they are formed would be particularly revealing, because this could shed light on the underlying mechanisms of variation and contribute to a more comprehensive understanding of the system in Italian. Complete answers have been taken into account only in Andorno and Rosi (2015) and, as pointed out before, they report results from both answers to questions and assertions, which do tend to behave differently (see Farkas & Bruce 2009, Holmberg 2015). In addition, because languages vary as to their response system, we may want to know whether Italian children are tuned to the response system of their target language and how they compare

Table 4: Summary of Andorno and Rosi’s (2015) results.

		NA		PD	
		Map Task (%)	Interview (%)	Map Task (%)	Interview (%)
RP used	<i>si</i>	0	1	63	42
	<i>no</i>	86	72	7	20
Answer types	RP	39	26	12	2
	Continuation	12	21	21	20
	Complete	61	74	88	98

to adult Italian in this respect. As we will see, this last step would require a careful investigation of the adults' answers as well, because the shape of answers to polar questions is rather complex. Before moving to the experimental part of this paper, where we will define the objectives of the current study, we report on previous studies on the acquisition of polar questions in child language.

1.4 Previous studies on acquisition

The literature from the acquisition side has focused on different aspects of positive and negative polar questions, namely, their comprehension and production and, in a subset of the studies, on the type of answers produced.

The first pioneering work of Smith (1933) analyzed spontaneous conversation of 219 English children (1;6-6;0). Children as young as 2 were already productive in their use of polar questions, which were also the type most frequently found across all age groups. These results are in line with the development of questions described by Ervin-Tripp (1970), who reported the results from a longitudinal observation of 5 English children (1;9-2;5). Polar questions, together with *what* and *where* *wh*-questions, were the first questions to be understood and produced, even though with a delay of several months between evidence for comprehension and their productive use. The high rate of production of polar questions with respect to *wh*-questions was confirmed by Tyack and Ingram (1977), who reported that in the spontaneous conversation of 22 English children (2;0-3;11), slightly more than 60% of the total questions asked were polar questions.¹¹ Unfortunately, for none of these studies do we know whether the polar questions produced by children were positive or negative ones. On this matter, Woods and Roeper (2020, 2021) looked at the production of negative polar questions (with other negation forms, such as negative tag questions) in a corpus study on English-speaking children aged 1;7-4;0. They showed that tag questions appear before negative polar questions, which are consistently produced starting from 2;6. The latter are realized with some errors, usually regarding the auxiliary. However, in all these studies, nothing is said about the type of answers provided by children, with the exception of Ervin-Tripp (1970), who simply noted that in the language samples of 24 English children (2;6-4;2), as an answer to most polar questions children uttered the RP only.

Akiyama (1979) compared the acquisition of the answering system of English, Japanese, and English-Japanese bilingual children (3-6 years old). The comparison is interesting in that English and Japanese rely on different systems: as mentioned in Section 1.1, English, like Italian, has been described as a P-N language and Japanese as an A-D language. Children were asked both positive and negative questions, to which the experimenters expected either positive or negative responses. Their answers were then coded for correctness on the basis of what the expected answers were (e.g., for a positive expected answer the correct answer was *yes* in English). Both oral and gestural answers were considered. As shown by the rate of unexpected (incorrect) answers, negative polar questions were slightly harder than positive polar questions for English monolingual children and significantly harder for Japanese monolingual children. Moreover, for bilingual children, Japanese negative questions were harder than English ones. Given that these were even below chance, the authors suggested that children tended to rely on the English system rather than on the Japanese one (especially the younger children). Also, performance on positive and negative questions in English for bilingual children was similar to the monolingual group, but the same was not true for negative questions in Japanese. They concluded that the English system seems to be acquired earlier, suggesting that the P-N system is easier than the A-D one. However, note that these conclusions were not based on a detailed analysis of all the answer types: they only focused on the RP and on the correctness of the answers, rather than on what was actually produced by children.

¹¹Although a wealth of studies have suggested that polar questions are acquired before *wh*-questions (see also Casillas et al. 2016, Newport et al. 2020, among many others) and easier to process (Rossano 2010), we acknowledge that some studies have reported the opposite trend (Ginzburg & Moradlou 2013, Moradlou et al. 2021).

Other studies also focused on the answers to polar questions. For example, Casillas et al. (2016) reported the results of a longitudinal study of children's response latencies after different types of *wh*-questions and polar questions. They looked at the spontaneous conversation of five English children (1;8-3;5) and analyzed the response latencies on the basis of the complexity of the question and the answer. The latter was calculated by computing their lengths in morphemes and clauses: answers containing only the RP were among the simple ones, as well as verbatim repetitions of part of the question. The authors showed that polar questions were answered the fastest and reported that children were able to produce simple answers early on. However, when children gave more complex answers, response latencies were longer, but they decreased significantly with age. In addition, as children grew older, they tended to add additional material to the RP (*complete*) and sometimes they even omitted the RP (*continuation*). Noveck et al. (2021) also measured response reaction times but focusing only on positive and negative polar questions. They showed that 6-year-old child French speakers take longer to provide *si* responses, which are used to convey PD, than they do with *oui* or *non*, which are used for agreeing (positive or negative) answers (PA and NA) and disagreeing negative answers (ND).

To move to two studies that discussed what children produced in their answers to polar questions beyond the RPs, Santos (2003) investigated positive answers to positive polar questions of two European Portuguese children (1;6-3;11). European Portuguese allows for different types of answers: those made of an RP only, those made of a verb (either the lexical verb or the auxiliary) only, and those made of an adverbial only, similar to *already*. These four types of answers are not fully equivalent: they yield syntactic and discourse differences. She individuated three stages in the acquisition of answers: (i) only the lexical verb is produced, (ii) other types of minimal answers slightly emerge but the lexical verb is still the predominant one, and (iii) the use of RP *yes* answers increases.

Finally, Thornton (2010) studied question-answer pairs in the longitudinal spontaneous speech samples of two English children (1;11-2;11). She showed that in their answers to polar questions, children gave two types of answers: those in which they were simply answering the question by uttering the RP plus some additional material connected to the confirmation or denial of the proposition contained in the question itself (direct answers) and those in which they were actually adding more information through which they were elaborating or giving explanations (indirect answers). The latter could either be accompanied by the RP or occur alone. Within the direct answers, which were the majority, she showed that children were either providing an elided answer (with the RP and optionally the auxiliary) or, in earlier stages, full-sentence answers (*complete*).

To sum up, from previous studies on acquisition we know that polar questions are produced and comprehended very early on and that positive polar questions are easier to answer than negative ones. Not much is said about whether in their answers children are relying on their language system (P-N or A-D), with the exception of Akiyama (1979). Several studies focused mainly on the answering of positive polar questions only (see Santos 2003) or did not give a clear-cut division between positive and negative polar questions (Smith 1933, Ervin-Tripp 1970, Tyack & Ingram 1977, Thornton 2010) or between positive and negative answers (Thornton 2010). Moreover, when the answers to negative polar questions were considered, the focus was on the correctness of the answers, rather than on what was actually produced by children (see Akiyama 1979). This aspect was rather frequently left out. We plan to fill these gaps with our study, targeting children older than those in the papers reported so far. In this way, we may avoid the use of RPs only, or of simple sentences (as reported by Ervin-Tripp 1970, Thornton 2010, Casillas et al. 2016) and focus on the description of answering patterns beyond the RP.

2 The current study

The goal of the current study was twofold: (i) to investigate how adults and children answer positive and negative polar questions in Italian and (ii) to describe the answer types that were produced by adults and children with respect to the typological description of the Italian answering system reported so far (see Table 3). Adult data are necessary to draw a baseline for children's performance and to

determine whether Italian is strictly a P-N language or not. As we saw in [Section 1.3](#), Italian seems to allow some variation in the type of RP that can be used in answers to negative polar questions. We need to experimentally verify whether such variation exists and, if so, where it occurs in adults before turning to children.

We elicited answers to both positive polar questions and negative polar questions (among which we distinguished negative polar questions with sentential negation and negative polar questions containing a negative indefinite) and manipulated the contexts in which the questions were asked (a context where *p* was the case and a context where *not p* was the case) to obtain the production of all four polarity feature combinations, namely, PA, PD, NA, and ND. Further details about the design and the methodology of our study are given in the following sections. Note that these have been preregistered on the Open Science Foundation website before the collection of any data (see link in the Data availability Section).

2.1 Methodology

2.1.1 Participants

Thirty-six monolingual Italian-speaking children and 31 Italian-speaking adults participated in the study. Four children were excluded: three were diagnosed with language difficulties (as reported per the questionnaire that legal guardians of child participants filled in) and the audio files of one child were empty. Three adults were excluded, because one misunderstood the task and the audio files of the other two were empty. As a result, the final number of participants included in our study was 32 children (16 females, 16 males) and 28 adults (20 females, 8 males).¹² Child participants were recruited from two kindergartens in the Milan area, and adult participants were recruited from the University of Milano-Bicocca. Children's ages ranged from 4;1 to 6;3 ($M = 5;0$, $SD = 0.7$) and adults' ages ranged from 19 to 50 ($M = 25;2$, $SD = 6.5$). None of the participants included in the study was diagnosed with certified language and/or hearing difficulties at the moment of the testing.

The study was approved by the Ethics Committee of the University of Milano-Bicocca (children study, prot.508) and was evaluated by the local commission for minimal-risk studies of the Psychology Department (adult study, RM2020-229). According to the World Medical Association's Declaration of Helsinki ethical principles, signed informed consent to participation was obtained from parents or legal guardians of children participants, verbal consent by children, and signed or online consent from adult participants.

2.1.2 Materials

We elicited the answering of polar questions in Italian via a game between participants and a puppet monkey. Participants were presented with a series of pictures depicting short stories while simultaneously listening to a voice describing what was happening in the pictures. We provide an example of a complete experimental item in [Figure 1](#).¹³ Each item started with a first picture (A) where the character(s) and objects relevant to the story were introduced (lexical entries). Starting from the second picture (B), the puppet monkey disappeared and the main character performed one of two possible actions and did not perform the other one. For instance, in [Figure 1](#), the man is taking a jumper and wearing it and is not taking any coat (Pictures C and D). These situations were called 'states of affairs' (following a definition by Servidio et al. 2018 given in [Section 1.3](#)); more specifically, contexts where *p* was the case (e.g.,

¹²All child participants were monolingual, as reported per the bilingual questionnaire "QuChiLiBa." The questionnaire is an adaptation of the PABIQ questionnaire (Tuller 2015) created in the (COST) Action IS804 "Language Impairment in Multilingual Society: Linguistics Patterns and the Road to Assessment."

¹³For readability purposes, we provide in [Figure 1](#) the English translation of this experimental item. The Italian version, which participants were presented with, can be found in the Supplementary Materials and the Italian translations of the questions can be found in (11).

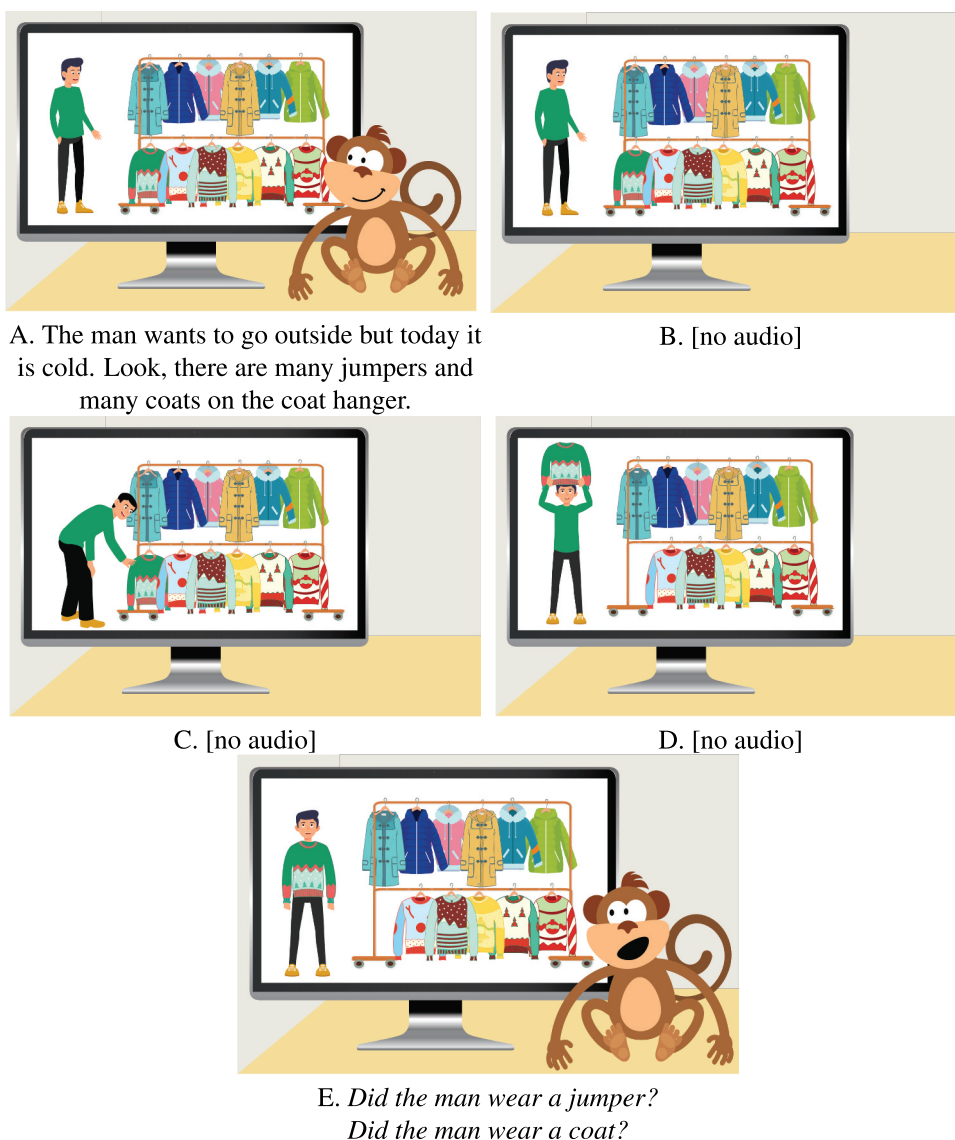


Figure 1: Example of an experimental item for PQ question type.

the man wears a jumper in Figure 1) are a *positive* state of affairs, versus contexts where *not p* was the case (e.g., *the man doesn't wear any coat* in Figure 1), which are a *negative* state of affairs. Participants were told to pay attention to the story while the monkey was outside. The monkey, who had not seen what happened, then appeared again on the screen in the last picture (E) and asked participants two polar questions of the same type (written in italics in Figure 1) —‘question types’—inquiring about both the positive and negative state of affairs.

‘Question types’ were of three kinds: positive polar questions (PQ) as in Figure 1 and example (11), negative polar questions containing sentential negation (NQ), and negative polar questions containing the negative indefinite *nessuno* ‘nobody’ in subject position (QQ). That is, in addition to investigating the answering of positive and negative polar questions in Italian, our study explored the answering of negative questions involving two different kinds of negation. Based on previous acquisition literature which has shown that Italian children at age 4 have already full

master of negation and of negative indefinites (see Tagliani et al. 2022, Raminelli 2024 and references therein), we did not expect Italian children – as adults – to answer differently to these two types of negative questions.

Each of these questions required one positive and one negative answer, which mirrored the state of affairs of the situation depicted in the story, as shown in (11a) and (11b) for PQ. An example for the other two question types (NQ and QQ) is given in the Supplementary Materials.

- (11) a. *Il signore si è messo il maglione?*
 the man REFL be.3SG worn the jumper
 ‘Did the man wear the jumper?’
 Sì, (se l’è messo). POSITIVE
 yes REFL it=be.3SG worn
 ‘Yes, he wore it.’
- b. *Il signore si è messo la giacca?*
 the man REFL be.3SG worn the coat
 ‘Did the man wear the coat?’
 No, (non se l’è messa). NEGATIVE
 no not REFL it=be.3SG worn
 ‘No, (he didn’t wear it).’

Stories were constructed in such a way as to legitimize the use of positive and negative polar questions. Even though polar questions all raise the issue of choosing between a proposition *p* and its negation, previous work has shown that polar questions may convey different information on what the speaker’s belief is with respect to the proposition *p* and what evidence has become available to the participants in the discourse (Ladd 1981, Büring & Gunlogson 2000, Romero & Han 2004, Roelofsen et al. 2012, Domaneschi et al. 2017, among many others). Specifically, positive polar questions are compatible with no speaker bias for the proposition *p* (i.e., no belief or expectation from the speaker that the proposition *p* is true) but with either contextual evidence for the proposition *p* (i.e., expectation that *p* is true induced by evidence that has just become available to the participants in the current discourse) or no contextual evidence. In contrast, negative polar questions have been shown to come with either no speaker bias and contextual evidence for the negation of *p*, speaker bias for *p* and no contextual evidence, or speaker bias for *p* and contextual evidence for the negation of *p*. As a result, the stories were constructed in such a way as to satisfy these two biases (see scenarios provided in the Supplementary Materials).

For each question type (PQ, NQ, and QQ), four stories were created. As previously mentioned, in each story two polar questions were asked requiring two different answers on the basis of the state of affairs: one positive and one negative. The resulting combinations corresponded to the four polarity feature combinations (PA, NA, ND, PD), which for the sake of clarity we report in Table 5. As a result, we had 8 questions per question type for a total of 24 polar questions. We ensured that none of the polar questions involved narrow focus to avoid affecting the answering pattern (see Servidio et al. 2018). Participants’ task was to orally answer each question.

Table 5 summarizes our design together with our expectations in terms of answers.

Table 5: Summary of the design.

Question types	State of affairs	
	Positive	Negative
PQ	Positive Agreement (PA): Il signore si è messo il maglione? 'Did the man wear the jumper?' Sì, (se l'è messo). 'Yes, (he did).'	Negative Disagreement (ND): Il signore si è messo la giacca? 'Did the man wear the coat?' No, (non se l'è messa). 'No, (he didn't).'
NQ	Positive Disagreement (PD): Il bambino non ha mangiato una banana? 'Did the boy not eat a banana?' Sì, *(l'ha mangiata). 'Yes, (he did).'	Negative Agreement (NA): Il bambino non ha mangiato una mela? 'Did the boy not eat an apple?' No, (non l'ha mangiata). 'No, (he didn't).'
QQ	Positive Disagreement (PD): Nessuno ha preso un giocattolo? 'Did no one take a toy?' Sì, *(qualcuno l'ha preso). 'Yes, (someone did).'	Negative Agreement (NA): Nessuno ha preso un libro? 'Did no one take a book?' No, (nessuno l'ha preso). 'No, (no one did).'

2.1.3 Procedure

The experiment was implemented using the online platform Labvanced (Finger et al. 2017). All experimental items were prerecorded by two Italian native speakers, one performing the narrator and one performing the puppet monkey. The instructions were prerecorded for child participants, whereas they were presented via written text to adult participants. The duration of the task varied between 15 and 20 minutes depending on the subject.

Children were tested in a quiet room, at the institution where they were recruited, with an experimenter present. The experimenter had them sit in front of a laptop on which the task was played, through the Labvanced platform. The stories were played only once. Children could tell the experimenter to stop the game whenever they wanted. Throughout the game, the experimenter gave no special feedback, only general encouragement. Adult participants, on the other hand, took the study on their own, either on a laptop or on a tablet. As with the children, they could interrupt the game whenever they wanted.

Every participant saw all items. The presentation of the items was manipulated to avoid having more than two items involving the same question type in a row. Similarly, in each story, we manipulated the order of state of affairs (positive and negative) in such a way that the same relative order of the two kinds of answers would not occur more than twice in a row. Before starting the experimental phase, participants went through a training phase of two stories (one where two PQs were asked and the other one where two NQs were asked) to get to know how the game worked and, in particular, to get used to the fact that the monkey was present for part of the stories only, as shown in Figure 1 (specifically, in pictures A and E).

Participants' productions were audio-recorded. They were then transcribed and coded by two native speakers of Italian and double-checked for consistency. The coding procedure will be explained in detail in the next section.

2.2 Coding

As discussed in Section 1 and in Andorno and Rosi (2015), answers to polar questions can be composed of two parts: (i) an RP optionally co-occurring with (ii) a continuation. As a result, three

logical possibilities for answer types are in place: either *RP* or *continuation* is produced or both are produced—*complete* answers.¹⁴ In this line, we coded the different answer types provided by the participants as follows: *RP* when they only produced a response particle (12a), *continuation* when they only produced a continuation (12b), and *complete* when they produced an RP followed by a continuation (12c).¹⁵ Although *continuation* answers are logically possible, they should not be an option in the Italian answering system (as shown in Table 3). Nonetheless, we could not exclude possible occurrences of such answers because Andorno and Rosi (2015) reported a considerable percentage of responses without a verbally produced RP. Due to the nature of our task (oral task with recorded audios), we could only count *si/no* verbal productions of RPs. We could not include any other visible counterpart/gestures representing the RPs (for instance, a nod or a head shake) as in Akiyama (1979), Enfield et al. (2019), and Rossano (2010). As a result, we treated *continuation* as a logical possibility of answer types (alongside *RP* and *complete*). We will return to the nature of this strategy in the discussion in Section 4.

(12) *Il signore si è messo il maglione?*

the man REFL be.3SG worn the jumper

‘Did the man wear the jumper?’

a. *Sì.* RP
yes

‘Yes.’

b. *Il signore si è messo il maglione.* Continuation
the man REFL be.3SG worn the jumper

‘The man wore the jumper.’

c. *Sì, il signore si è messo il maglione.* Complete
yes the man REFL be.3SG worn the jumper

‘Yes, the man wore the jumper.’

Furthermore, we coded our data for ‘congruency’. We defined an answer as *congruent* when the polarity of the RP matched the one expected in a P-N system and as *incongruent* when it did not match. More specifically, we expected the production of *si* when the state of affairs of the context presented was positive (i.e., in PA and PD answers) and *no* when it was negative (i.e., in ND and in NA answers). Crucially, congruency was evaluated only with respect to the polarity of the RP, because it is the only part of the answer that can undergo variation (cf. the definition of correctness in Akiyama (1979)). This coding allowed us to check whether our participants (both adults and children) followed strictly a P-N system, as reported in Table 3, or whether they exhibited some variation in the use of RPs in PD—and possibly NA—answers, as discussed in Andorno and Rosi (2015), Bernini (2001) and in Section 1.3. To illustrate, in example (13) where a negative question (NQ) was asked in a negative state of affairs (see the Supplementary Materials for the full scenario), both answers provided in (13a) and in (13b) are congruent (C) with the negative state of affairs. In contrast, answers like (13c) and (13d) are both incongruent (I).

¹⁴We remind the reader that we provide a list of the presented terms and their definitions at the end of the paper in the Glossary section.

¹⁵As we already anticipated in footnote 2 and in the examples in the Introduction, Italian also allows the possibility of subject pro-drop (*pro* *si è messo il maglione.*) in (12b) and (12c). Moreover, in the same examples, the direct object could be substituted with a clitic object (*il signore se l'è messo.*). Also, the combination of both pro-drop and object clitic is accepted (*(pro)* *se l'è messo.*). We considered all these cases as acceptable productions of *continuation/complete* answers also in the coding of our data.

(13) *Il bambino non ha mangiato una mela?*

the boy not have.3SG eaten an apple

‘Did the boy not eat an apple?’

a. *No.* RP (C)

no

‘No.’

b. *No, il bambino non ha mangiato una mela.* Complete (C)

no the boy not have.3SG eaten an apple

‘No, the boy did not eat an apple.’

c. *Sì.* RP (I)

yes

‘Yes.’

d. *Sì, il bambino non ha mangiato una mela.* Complete (I)

yes the boy not have.3SG eaten an apple

‘Yes, the boy did not eat an apple.’

Continuation answers were excluded from the coding on congruency: because the RP was not produced (or at least not verbally expressed), we could not assign congruency values to this type of responses. Because the continuation is the part of the answer that should not undergo variation in the Italian system, all the cases in which it did not match the expected state of affairs were considered incorrect answers.¹⁶

2.3 Research questions

Going back to the main goals of the present work, we can now define our research questions and related predictions.

RQ1: What answer types do children and adults provide when answering polar questions? Do they differ in these respects?

RQ2: Do children’s and adults’ answers fit strictly with a P-N system?

Concerning RQ1, we predict that adult participants will produce RP answers across all three question types—PQ, NQ, and QQ—in the PA, ND, and NA conditions. This prediction is based on two main considerations. First, following Holmberg’s (2015) proposal detailed in Section 1.2, the continuation does not need to be overtly realized at PF when it is identical to the PolP of the immediately preceding question aside from the value of Pol. This is the case in the PA, ND, and NA conditions. Second, we think that principles of efficient communication (Grice 1975) will also influence speakers in their responses. In particular, they could be guided by the Maxim of Manner, which instructs speakers to be as clear and as brief as possible and to avoid ambiguity, and the Maxim of Quantity, which instructs speakers to produce the most informative utterance that is relevant for the purposes of the conversation and not more. Taken together, they predict that adults will favor RP answers in PA, ND, and NA

¹⁶An example of an incorrect answer is the following: *La bambina non ha usato gli sci?* ‘Did the girl not use the skis?’ Correct (expected) answer: *Sì, li ha usati.* ‘Yes, she did.’ Incorrect answer: *No, non li ha usati.* ‘No, she didn’t.’

conditions, because the continuation would be redundant. In contrast, for the PD condition, adults should produce complete answers. In this case, the meaning of the RP alone is indeterminate (see [Section 1.2](#)), and a complete answer becomes both as informative as is needed for the purpose of the conversation and as brief and clear as possible, satisfying the Gricean maxims.

As for children, we expect them to produce RP answers across all three question types—PQ, NQ, and QQ—in the PA, ND, and NA conditions. Previous literature has shown that 5-year-old children have acquired the component of the Maxim of Manner/Quantity that encourages speakers to be as brief as possible, and they can produce utterances that are both brief and relevant (Davies & Katsos 2010, Clark & Kurumada 2013, Yatsushiro & Sauerland 2019). In contrast, for the PD condition, we expect children to produce complete answers, as adults do, if they realize that producing just the RP leads to an ambiguity. If they do not, they will produce RP answers. Though such answers are brief (satisfying the brevity aspect of the Maxim of Manner), they are not as informative as required by the Maxim of Quantity and introduce ambiguity (violating the clarity component of the Maxim of Manner), because it is unclear whether the continuation is positive or negative. This highlights a potential tension between conversational maxims: children may prioritize brevity over informativeness and disambiguation. To the best of our knowledge, the interaction between different maxims in children has not been systematically studied. However, this ranking is consistent with previous developmental literature showing that by age 5, children have acquired the brevity component of the Maxim of Manner (Davies & Katsos 2010, Clark & Kurumada 2013, Yatsushiro & Sauerland 2019), and they begin to show sensitivity to violations related to ambiguity avoidance, although they typically reach adult-like performance only around age 6 (Okanda et al. 2015, Panzeri & Foppolo 2021). Though children at the age of 5 are able to compute the Maxim of Quantity to some extent (Foppolo et al. 2012), they are not fully adult-like (Guasti et al. 2014).

Zooming in on negative questions, we expect Italian children—similar to adults—to not show a different behavior between NQ and QQ because, as previously mentioned, they have already full mastery of negation and of the negative indefinite *nessuno* ‘nobody’ at age 4 (Tagliani et al. 2022, Raminelli 2024).

Finally, for both adults and children, we do not expect any production of continuation answers, because they should not be an option in the Italian system.

As far as RQ2 is concerned, we predict that adults will mainly produce answers following strictly the P-N system, as defined in [Table 3](#) ([Section 1.3](#)). When answering PQ, they will produce RP *sì* in PA and RP *no* in ND; that is, only congruent (RP) answers. For NQ/qq, we predict that adults will mainly produce RP *no* in NA and RP *sì* in PD (both congruent answers). Once again, we hypothesize that we should not find any differences in the answers provided by participants to these two kinds of negative questions. If previous studies are on the right track (Bernini 2001, Andorno & Rosi 2015), as mentioned in [Section 1.3](#), we would also predict that adults produce some incongruent answers in NA and PD. More specifically, we would expect them to sometimes utter RP *sì* in NA and RP *no* in PD. However, these incongruent answers should be less frequent than the congruent ones (Andorno & Rosi 2015) and possibly less frequent in NA than in PD (see Bernini 2001).

Turning to children, we expect them to provide the same answers as adults in PQ; that is, only congruent answers. As for NQ/qq, we do not expect any differences between the two groups in the choice of RP that is used. If adults’ data reveal that the Italian system is strictly P-N, we expect them to produce only congruent RP. However, if the system is subject to variability as described in some of the previous literature, our expectations might go in different directions: on the one hand, if they behave in line with adults, we expect children to produce some instances of incongruent RP in PD and—potentially—in NA. On the other hand, if, as has been claimed in Akiyama (1979), the P-N system is easier to acquire for children, we may instead find only congruent answers.

2.4 Statistical Analysis

The analyses conducted for the present study differ from those preregistered. The originally proposed model turned out to be insufficiently fine-grained to capture the patterns observed in the data. To address this limitation, we refined the coding scheme by introducing additional categories and consequently implemented three separate models—one multinomial and two binomial—rather than the single binomial model initially planned. The statistical analyses were run in the R core statistics environment (R Core Team 2021). The choice to use a multinomial or binomial model was based on the number of levels in the ‘answer type’ variable. When all three levels of the dependent variable were considered (*RP*, *continuation*, and *complete*; see example (12) in Section 2.2), as in the model including the group comparison, a multinomial model was used with *RP* set as the reference category. A binomial model was used instead when focusing on adults (where the continuation answer type was excluded) and in the analysis on congruency, where the dependent variable included only two levels (*congruent/incongruent*). In particular, a first multinomial mixed logistic including ‘group’ (*adults/children*), ‘question types’ (*NQ/PQ/QQ*), and ‘state of affairs’ (*negative/positive*) as fixed factors and participants as random effects was run using the *mblogit* function of the ‘*mclogit*’ library (Elff et al. 2022). Categorical predictors were coded using treatment contrasts (R default, *contr.treatment*), with the first level as reference. This scheme was adequate for our purposes, because in the multinomial model, we did not interpret individual coefficients but focused on the global effects (Wald test) and on the overall three-way interaction. As a second step, we focused our attention on adults’ responses by running a binomial mixed logistic model through the function *glmer* of the ‘*lme4*’ library (Bates et al. 2014), including ‘question types’ (*NQ/QQ*) and ‘state of affairs’ (*negative/positive*) as fixed factors and including participants as random effects. Post hoc comparisons were extracted using the ‘*emmeans*’ library (Lenth 2022) and applying a Bonferroni correction. As a last step, to explore whether participants gave *congruent* or *incongruent* answers, defined as in Section 2.2, we maintained the same binomial model as the previous one but setting ‘congruency’ (*congruent/incongruent*) as a dependent variable.

3 Results

As a first step, we excluded from the data set (i) trials in which participants gave incorrect answers, which unambiguously showed that they misunderstood the situation observed on the screen, namely, cases of incorrect continuations and incorrect complete answers where the continuation stated the opposite state of affairs than the one depicted in the scenario; (ii) missing audios; and (iii) other answers that could not be coded as *RP*, *continuation*, or *complete* answers (e.g., ‘maybe/I don’t know’ type of answers). Accordingly, 19 answers (10 incorrect, 8 missing audio, and 1 other) were excluded from the children’s data set and 18 answers (3 incorrect, 12 missing audio, and 3 other) were removed from the adults’ data set.

3.1 Answer types

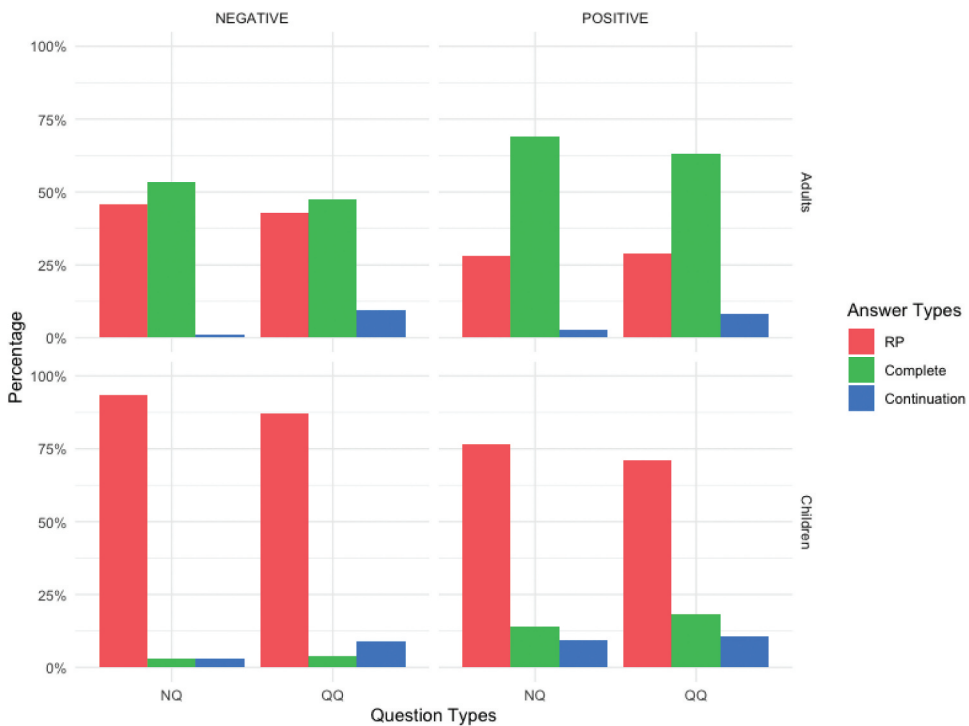
By looking at the stratification of data in the whole sample, participants mostly provided *RP* answers (69.4%). About 26% of answers were *complete*, and about 5% only were *continuation* answers. As shown in Table 6 and reported in detail in Table A of the Supplementary Materials, we observed that children did not give *complete* answers in *PQ* but mostly used *RP* (99.6%). This tendency was not observed in adults under the same condition, where 27.7% of the total answers given were *complete* and 71.8% were expressed through an *RP*. Although these descriptive results suggest a different behavior in children compared to adults, specifically in their systematic use of *RP* answers in *PQ*, we had to exclude the *PQ* condition from the statistical model precisely due to the lack of variance in children’s responses.

Results of the mixed multinomial logistic model including children and adults on the *NQ* and *QQ* conditions (see Figure 2) revealed a significant group-by-question types-by-state of affairs interaction ($\chi^2(1) = 4.1, p = 0.04$), a question types-by-state of affairs significant interaction ($\chi^2(1) = 13.2, p < 0.001$), as well as a group-by-state of affairs significant interaction ($\chi^2(1) = 7.1, p = 0.007$). Moreover, significant main effects were found for group

Table 6: Stratification of answer types produced by adults and children in PQ, NQ, and, QQ, and in negative and positive state of affairs.

		Adults				Children			
		Negative		Positive		Negative		Positive	
PQ	RP	79	72.47%	79	71.17%	127	100%	126	99.2%
	Continuation	0	0%	1	0.9%	0	0%	1	0.8%
	Complete	30	27.52%	31	27.92%	0	0%	0	0%
	Total	109	100%	111	100%	127	100%	126	100%
NQ	RP	50	45.87%	31	28.18%	117	93.6%	97	76.37%
	Continuation	1	0.91%	3	2.72%	4	3.2%	12	9.44%
	Complete	58	53.21%	76	69.09%	4	3.2%	18	14.17%
	Total	109	100%	110	100%	125	100%	127	100%
QQ	RP	46	42.99%	31	28.7%	107	86.99%	85	70.83%
	Continuation	10	9.34%	9	8.33%	11	8.94%	13	10.83%
	Complete	51	47.67%	68	62.92%	5	4.06%	22	18.33%
	Total	107	100%	108	100%	123	100%	120	100%

Note. A bar plot representing these data can be found in Supplementary Materials (Figure D).

**Figure 2:** Frequencies of RP, complete, and continuation answers provided by adults (on the top) and children (on the bottom) in NQ and QQ, and in negative and positive state of affairs.

($\chi^2(1) = 18, p < 0.001$) and question types ($\chi^2(1) = 30.9, p < 0.001$; see Table B in the Supplementary Materials). The three-way interaction suggested that the choice of providing an RP depends on the question types and the state of affairs but only in one of the two groups, that is, in adults. Moreover, considering the two-way interactions, we could observe on the one hand that all participants provided a lower number of continuation answers in negative state of affairs in NQ (see Table 7) than in QQ; on the other hand, children tended to provide a different RP/continuation/complete ratio in positive than in negative state of affairs, providing more continuation answers in positive state of affairs (see Table 8).

Table 7: Frequency of RP, continuation, and complete type of answers in the two groups, stratified by question types and state of affairs.

	NQ		QQ	
	Negative (%)	Positive (%)	Negative (%)	Positive (%)
<i>RP</i>	71.37	54.01	66.52	50.88
<i>Continuation</i>	2.14	6.33	9.13	9.65
<i>Complete</i>	26.5	39.66	24.35	39.47
<i>Total</i>	100	100	100	100

Table 8: Frequency of RP, continuation, and complete answer types, regardless of question type, stratified by state of affairs and group.

	Negative		Positive	
	Adults (%)	Children (%)	Adults (%)	Children (%)
<i>RP</i>	53.85	93.6	42.86	82.35
<i>Continuation</i>	3.38	4	3.95	6.95
<i>Complete</i>	42.77	2.4	53.19	10.70
<i>Total</i>	100	100	100	100

To better interpret the three-way interaction results, we looked at the effects that emerged from paired comparisons of answer types, considering RP as a reference. As also depicted in Figure 2, the probability of providing a continuation answer instead of an RP decreased in NQ and in negative state of affairs only for adult participants ($estimate = -5.22, Z = -4.23, SE = 1.23, p < 0.001$). On the other hand, although children and adults provided a significantly different number of complete and RP answers ($estimate = -5.38, Z = -5.56, SE = 0.96, p < 0.001$), with children using mostly RP answers under all conditions, the tendency to provide complete answers instead of RP generally increased in positive state of affairs ($estimate = 1.50, Z = 3.62, SE = 0.41, p < 0.001$). The same pattern was observed on the whole sample for the tendency to produce more continuation answers in positive rather than in negative state of affairs, even if with a lower significance than those observed for the effect of question types ($estimate = 2.58, Z = 2.02, SE = 1.27, p = 0.04$; see Table C of the Supplementary Materials). In general, a higher number of continuation answers was provided for QQ than NQ ($estimate = 3.15, Z = 1.17, SE = 2.67, p = 0.007$; see Table C of the Supplementary Materials) but, because the number of continuation answers was very low in the whole sample and under all conditions (Table 6), these data should be considered with caution. Results emerging from paired answer types equations are reported in the Supplementary Materials (Table C).

A further model on adult participants was run to include the PQ condition and, thus, understand whether we could find significant differences between all three question types. Due to the very low number of continuation answers provided by adult participants, especially in PQ (Table 6), we removed this level, and we then ran a binomial logistic mixed model. Through this model, we observed a significant state of affairs-by-question types interaction ($\chi^2(2) = 6.68, p = 0.03$), as well as a state of affairs ($\chi^2(1) = 16.88, p < 0.001$) and a question types significant main effect ($\chi^2(1) = 80.99, p < 0.001$). Post hoc comparisons (see Table D in the Supplementary Materials) revealed no significant differences in the stratification of answers to NQ and QQ and a general tendency to provide more complete answers in positive than in negative state of affairs, except for PQ. These results are shown in Figure 3.

3.2 Congruency

We then concentrated our analysis on ‘congruency.’ In this analysis, the continuation level of the answer types factor was not considered due to the reasons detailed in Section 2.2. The analysis was designed to test whether participants provided a higher degree of incongruent or congruent answers

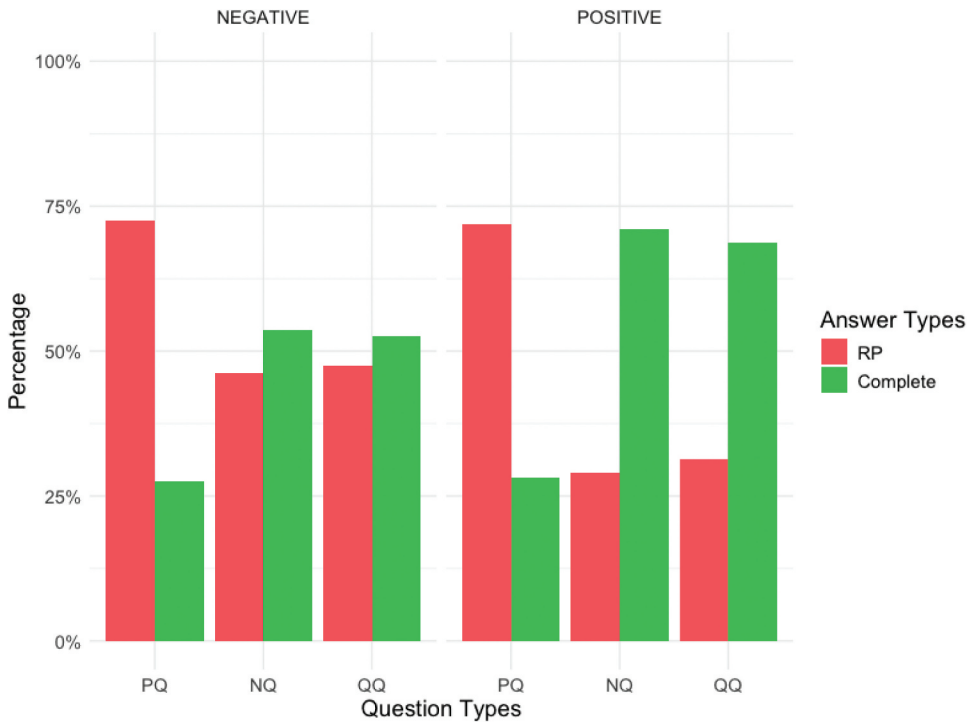


Figure 3: Frequencies of RP and complete answers provided by adult participants in PQ, NQ, and QQ, stratified for negative and positive state of affairs.

depending on state of affairs and/or question types. This further investigation was conducted only on adults, because children provided very few complete responses (see Table E in the Supplementary Materials for the stratification of complete and RP congruent/incongruent answers). In fact, children provided only 6.9% congruent complete answers and no incongruent complete responses. Complete answers were thus provided by children only in the congruent form (see Table E of the Supplementary Materials). In the statistical model run on adult participants, the PQ level of the question types factor was cut out because only congruent answers were provided (see Table 9 and Table F of the Supplementary Materials). We observed a generally low degree of incongruent answers (11.26%). Nevertheless, when comparing the congruent/incongruent answers, a significant effect of state of affairs emerged ($\chi^2(1) = 9.92, p = 0.001$; see Figure 4), as well as a significant effect of question types ($\chi^2(1) = 11.63, p < 0.001$; see Figure 4), but no interaction effect was observed ($\chi^2(1) = 1.80, p = 0.017$). Also exploring Bonferroni-corrected post hoc comparisons (see Table G in the Supplementary Materials), we observed a significantly higher degree of incongruent answers in positive (7.1%) than in negative state of affairs (4.2%; *estimate* = -1.57, *SE* = 0.53, *z* = -2.93, *p* = 0.003; see Figure 4) and in QQ (6.7%) than in NQ (4.6%; *estimate* = -1.6, *SE* = 0.54, *z* = -2.92, *p* = 0.003; see Figure 4).

We further explored descriptively congruent/incongruent answers, which could be expressed (depending on the answer type that was produced) either by RP only or complete answers. As shown in Table 9, in PQ adults produced only congruent responses, whereas in NQ and QQ they produced both congruent and incongruent answers. In particular, incongruent answers were realized as follows: in NQ, in negative state of affairs, they produced *n* = 5 RP and *n* = 8 complete answers, whereas in positive state of affairs they provided *n* = 5 RP and *n* = 11 complete answers. In QQ, in negative state of affairs, they produced *n* = 4 RP and *n* = 9 complete answers; in positive state of affairs, they produced *n* = 10 RP and *n* = 19 complete incongruent answers.

Table 9: Stratification of congruent and incongruent answers produced by adults and children in PQ, NQ, and QQ.

	PQ						NQ						QQ					
	Negative			Positive			Negative			Positive			Negative			Positive		
	Raw	%		Raw	%	% Total	Raw	%		Raw	%	% Total	Raw	%		Raw	%	% Total
Adults	Congruent	109	100	110	100	100	95	87.96		91	85.05	86.51	84	86.60		70	70.71	78.57
	Incongruent	0	0	0	0	0	13	12.04		16	14.95	13.49	13	13.40		29	29.29	21.43
Children	Total	109	100	110	100		108	100		107	100		97	100		99	100	
	Congruent	124	97.64	124	98.41	98.02	108	89.26		102	88.70	88.98	102	91.07		86	80.37	85.84
	Incongruent	3	2.36	2	1.59	1.98	13	10.74		13	11.30	11.02	10	8.93		21	19.63	14.16
	Total	127	100	126	100		121	100		115	100		112	100		107	100	

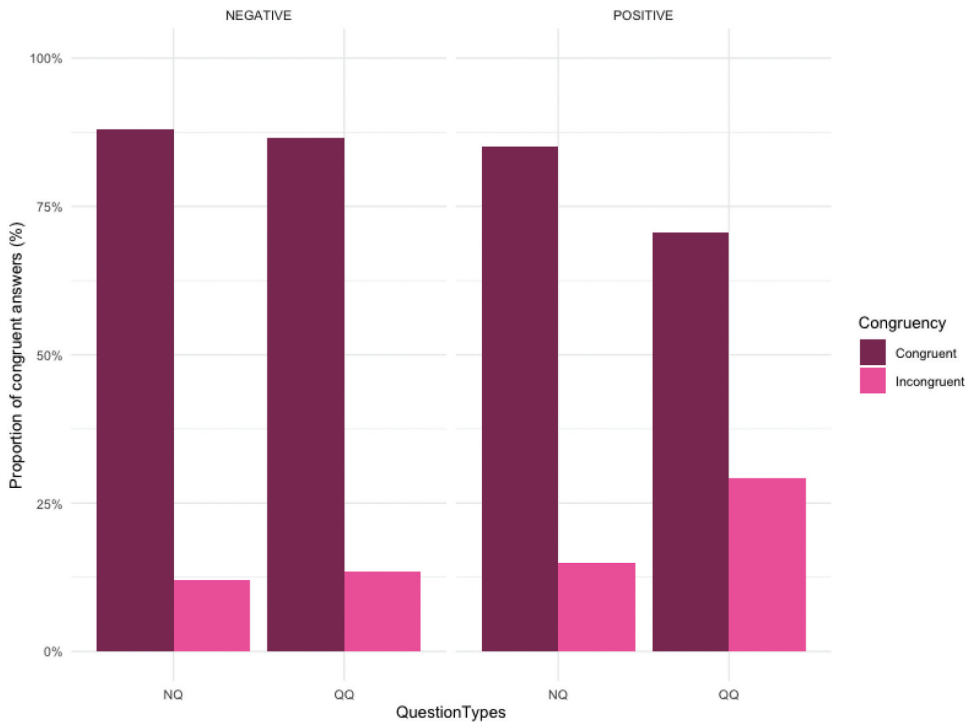


Figure 4: Frequency of congruent/incongruent answers provided by adult participants in negative and positive state of affairs, stratified for NQ and QQ question types.

Taking into account children's productions of congruent/incongruent answers in relation to those of adults, we first noticed that children did produce incongruent answers in all three conditions (see Table 9 and Table F in the Supplementary Materials). However, they did not produce any occurrence of incongruent complete answers. In fact, children's incongruent answers were all RP answers. In PQ, they produced $n = 3$ incongruent RP in negative state of affairs and $n = 2$ incongruent RP in positive state of affairs. In negative questions, starting with NQ, they produced $n = 13$ incongruent RP in negative state of affairs and $n = 13$ incongruent RP in positive state of affairs. Moving to QQ, in negative state of affairs children produced $n = 10$ incongruent RP, whereas in positive state of affairs they produced $n = 21$ incongruent RP.

4 Discussion

The aim of the current study was to investigate how children (aged 4 to 6 years old) and adults answer positive and negative polar questions in Italian. We focused our analysis on answer types by investigating the internal makeup of these answers—RP only, continuation, or complete—and whether children and adults fit strictly to the Italian answering system, which has been mainly described as a P-N language (Bernini 2001, Andorno & Rosi 2015, Servidio et al. 2018).

RQ1: What answer types do children and adults provide when answering polar questions? Do they differ in these respects?

Our results showed that both adults and children distinguished between positive and negative polar questions. As shown by the model reported in Section 3.1 and Table 6, adults resorted mainly to RP answers in PQ both for negative (72.47%) and positive (71.17%) state of affairs. Complete answers were produced in this condition but at significantly lower rates than RP answers (27.52% in negative and

27.92% in positive). In NQ/QQ questions, adults produced both RP and complete answers in negative state of affairs at very similar rates (between 42.99% and 53.21%), whereas they opted for complete answers more often (69.09% in NQ and 62.92% in QQ) than RP answers (28.18% in NQ and 28.7% in QQ) in positive state of affairs. These results confirmed our expectations: following previous results on Italian (Bernini 2001, Andorno & Rosi 2015), we expected adults to show a preference for complete answers mainly in the case of positive state of affairs in negative questions (i.e., in PD answers), because those are both as informative as needed for the purpose of the conversation and as clear and brief as possible, satisfying the Quantity and Manner Gricean Maxims. As expected, no difference between NQ and QQ questions emerged, suggesting that adults did not treat these two conditions differently.

Moving now to the children's data, our results also confirmed that Italian children behaved according to our predictions. They resorted almost exclusively (99%-100%) to RP answers in PQ (both negative and positive state of affairs) and in negative NQ (93.6%) and QQ (86.99%). In positive state of affairs of NQ and QQ (the PD condition), they still mainly relied on RP answers (76.37% in NQ and 70.83% in QQ). Nonetheless, they also produced some occurrences of complete answers (14.17% in NQ and 18.33% in QQ), although at a lower rate than adults. These results suggest that children aged 4 to 6 years are starting to assign to PD answers the requested "special status" (see also Noveck et al. 2021 on similar results), but they may not yet have fully acquired that these answers require a continuation to avoid ambiguity in interpretation. This gap between children and adults indicates that this mechanism may start being fully in place only at a later developmental stage, once Italian-speaking children have fully acquired the Gricean Maxims of Manner and Quantity. At this stage, children appear to prioritize the brevity component of the Maxim of Manner over the requirements of informativeness (Maxim of Quantity) and ambiguity avoidance (also part of the Maxim of Manner). This aligns with previous developmental research showing that by age 5, children have acquired the brevity component of the Maxim of Manner (Davies & Katsos 2010, Clark & Kurumada 2013, Yatsushiro & Sauerland 2019), and they begin to show sensitivity to violations related to ambiguity avoidance, although they typically reach adult-like performance only around age 6 (Okanda et al. 2015, Panzeri & Foppolo 2021). Including school-aged children (6 to 7 years old) in a follow-up study should clarify this aspect for the acquisition of answers to (negative) polar questions in Italian.

Although the general trend of our results confirms our main expectations, we also encountered some unexpected behaviors in both groups. Let us start with the adult group.

The first unexpected result concerns the production of a considerable number of complete answers in PQ both in negative and positive state of affairs and in NQ/QQ negative state of affairs. Complete answers in these conditions are acceptable but redundant in the sense that the production of the RP only is already enough to deliver the intended meaning (Section 1.2), and it is the most informative, clear, and brief answer. As we hypothesized in Section 2.3, adults should follow the Gricean Maxims of Manner and Quantity and therefore avoid the production of redundant material. Three explanations might be at work here. First, we can speculate that part of the behavior showed by our adult group was mainly due to the experimental nature of our task. The use of an elicitation task may have encouraged participants to produce unnecessary linguistic material, violating the brevity component of the Maxim of Manner and exceeding what is required by the Maxim of Quantity, which states that speakers should produce the most informative utterance that is relevant for the purposes of the conversation and not more. It has, in fact, been shown by previous studies that adults tend to produce unnecessary linguistic material if they are aware of being in an experimental setting, in an effort to be overly efficient (Engelhardt et al. 2006, Rubio-Fernandez 2019, Yatsushiro & Sauerland 2019, and references therein). We hypothesize that the use of more ecologically valid tasks, such as narratives or a guided interview with a confederate, would reduce the production of such redundant answers. Note, however, that in Andorno and Rosi (2015, Figure 9), where the authors used two dialogic tasks, involving one confederate and one experimental subject, the number of complete answers in negative state of affairs was high (between 61% and 74%). As an alternative solution, looking at corpora could offer a solution to clarify whether such strategies are due to a bias of the experimental setting. Nevertheless, this account does not explain the fact that in NQ and QQ we found almost twice as many complete responses as in PQ. A second potential explanation of our data relies on the idea that speakers are more likely to produce optional material when they are experiencing some level of production difficulty (see Jaeger 2010 on this

point). In particular, we might rely on the markedness scale (Pope 1972, Roelofsen & Farkas 2015) presented in Section 1.1, which predicts that answers to negative polar questions are indeed more marked than positive ones. In addition, negative polar questions are themselves more marked than positive ones, as has been shown in the psycholinguistic literature, in both acquisition and processing (Akiyama 1979, Kameyama 2013, Noveck et al. 2021, Maldonado & Culbertson 2023, among others). Therefore, we can expect that more markedness will lead not only to the use of special particles when these are an available option in a language but also to the production of more material, in an effort to balance between efficiency and understandability (Pate & Goldwater 2015, Tal et al. 2023). The third explanation we present to account for the use of complete answers is combined with the results regarding congruency:¹⁷ as already discussed in Section 3.2 and shown in Table 9, adult participants followed mostly, but not only, a P-N system. However, we did find some occurrences of incongruent answers in NQ and QQ in both positive and negative state of affairs. With this information in mind, we can also assume that the instances of complete answers are not examples of redundancy but rather a strategy adopted by participants to confirm the type of answering system they are relying on. It might be the case that both types of answering systems are active options in the speaker's mind and hence, by giving complete answers, they are completely avoiding ambiguities.

A second unexpected result concerns the production of the exact opposite trend: RP-only answers in the case of NQ/QQ positive state of affairs (around 28% of occurrences). No previous study has ever reported similar results with such high rates (cf. Andorno & Rosi 2015: 12% in the Map Task). When we looked at the individual performances (see Table A in the Supplementary Materials), between 12 and 14 adult participants answered with the RP in PD condition. This tendency may indicate that for some Italian speakers such a strategy can be adopted even in PD answers. However, we cannot exclude that these participants resorted to RP-only answers because they did not feel the need to specify the content of the continuation, relying on the idea that both speaker and hearer shared a common background knowledge (the concluding image of the story remained in front of the participant's eyes at the time of response). To confirm this last hypothesis, we will need to replicate the current results in more ecologically valid settings, notably using spontaneous speech productions.

Finally, we need to account for the production of continuation answers in both adults and children. Due to the compositional nature of answers to polar questions in Italian, namely, RP + (optional) continuation, continuations were included as a logically possible alternative (cf. Andorno & Rosi 2015). Nonetheless, we did not expect such constructions to occur in our results. The fact that continuation answers were produced raises the question of whether they should be regarded as an alternative strategy, albeit marginal due to their small number, to the core answering system of Italian or whether we are dealing with a bias of our methodology.¹⁸ In the former case, we are talking about the possibility for Italian speakers to resort to something that reminds echo system answering strategies: in languages that allow echo strategies (e.g., Welsh, Thai, Finnish, Portuguese, among many others), one or more constituents of the question can be repeated in the answer (see Sadock & Zwicky 1985 for a description of echo systems). In the latter case, these occurrences of continuation answers could be interpreted as complete answers without verbally expressed RPs. Because our task was only audio-recorded, we can imagine our participants expressing the RP with any other visible counterpart/gestures (a nod or a head shake) as in Akiyama (1979), Enfield et al. (2019), and Rossano (2010) and verbally producing only the continuation part of the intended complete answer. Due to a lack of evidence, we

¹⁷We thank two anonymous reviewers for pointing this out.

¹⁸An anonymous reviewer asked whether continuation answers might be connected to the use of contrastive focus. This does not seem to be the case. First, we would like to remind the reader that the questions used in our experiment were true information-seeking questions that had a neutral intonation and did not require a correction in the answers given. Second, if contrastive focus was involved in these continuation answers, we would expect to find them only in the PD condition (as in NA, the continuation shares the negative polarity of the question and hence does not involve a correction of the previous utterance). However, this prediction is not borne out in our data: continuation answers were produced at similar rates both in PD ($n = 12$) and in NA ($n = 11$). Third, it seems to us that even in case focus is indeed realized, the RP should be present in any case. Experimental studies are needed to shed some light on this matter.

cannot draw any conclusions on this particular aspect. Future research will include a video recording of the participants performing the task to help clarify the nature of continuation answers.

RQ2: Do children's and adults' answers fit strictly with a P-N system?

As shown in Table 9, adults only produced congruent answers in PQ, whether the state of affairs was positive or negative. This result confirms our expectations and is in line with previous work on Italian (Bernini 2001, Andorno & Rosi 2015). As for NQ/QQ questions, the results of the model reported in Section 3.2 show that adults produced some incongruent answers. In particular, they produced more incongruent answers in positive (7.1%) than in negative state of affairs (4.2%). Examples of incongruent answers produced in positive and negative state of affairs are provided in (14) and (15) respectively.

(14) NQ question and positive state of affairs

a. *La bambina non ha usato gli sci?*

the girl not have.3SG used the skis

'Did the girl not use the skis?'

b. *No, la bambina ha usato gli sci.*

no the girl have.3SG used the skis

'No, the girl used the skis.'

(15) NQ question and negative state of affairs

a. *La bambina non ha usato i pattini?*

the girl not have.3SG used the ice.skates

'Did the girl not use the ice skates?'

b. *Sì, non ha usato i pattini.*

yes not have.3SG used the ice.skates

'Yes, she didn't use the ice skates.'

The fact that incongruent answers like (14) and (15) were produced in positive and negative state of affairs and that more incongruent answers were produced in positive than in negative state of affairs was not expected in a strict P-N system. These results suggest that Italian adults do not follow a strict P-N system (as in Table 3), but they allow variation in the use of RP in PD and NA answers. Thus, based on our results from adults, we can provide an updated version of the Italian answering pattern in Table 10.

However, one should note that not all incongruent answers were complete answers as shown in (14) and (15). Before concluding anything from this unexpected result, one should look at the different types of incongruent answers that adult participants resorted to. Across the two types of negative questions NQ and QQ, both RP answers ($n = 15$ in positive state of affairs; $n = 9$ in negative state of affairs) and complete answers ($n = 30$ in positive state of affairs; $n = 17$ in negative state of affairs) were produced (summing the incongruent answers in NQ and QQ). Not much can be concluded from RP answers. Though such answers can be instances of incongruent complete answers whose continuation is not realized (that is, the answer in (16) would be interpreted as in (15)), they can also be due to a misunderstanding of the depicted story. In that case, *sì* in (16) would be interpreted as 'Yes, she used

Table 10: Italian answering pattern (updated).

	Agreement	Disagreement
Positive	Zoe ha scritto l'articolo? Zoe have.3SG written the=paper 'Did Zoe write the paper?' Sì, (l'ha scritto). yes (it=have.3SG written) 'Yes, she did.'	Zoe non ha scritto l'articolo? Zoe not have.3SG written the=paper 'Did Zoe not write the paper?' Sì/No, *(l'ha scritto). yes/no (it=have.3SG written) 'Yes/No, she did.'
Negative	Zoe non ha scritto l'articolo? Zoe not have.3SG written the=paper 'Did Zoe not write the paper?' No/Sì, (non l'ha scritto). no/yes (not it=have.3SG written) 'No/Yes, she didn't.'	Zoe ha scritto l'articolo? Zoe have.3SG written the=paper 'Did Zoe write the paper?' No, (non l'ha scritto). no (not it=have.3SG written) 'No, she didn't.'

them.'. Because no continuation is present, we cannot tease these two options apart and will thus focus on incongruent complete answers only.

(16) NQ question and negative state of affairs

- a. *La bambina non ha usato i pattini?*
the girl not have.3SG used the ice.skates
'Did the girl not use the ice skates?'
- b. *Sì.*
yes
'Yes.'

That incongruent complete answers were produced in positive state of affairs (i.e., in PD answers) is in line with Andorno and Rosi (2015). However, that such answers were also produced in negative state of affairs (i.e., in NA answers), albeit at a lower rate (4.2%) than in positive state of affairs (7.1%), was not found in their study. This result provides further experimental evidence for Bernini's (2001) claim that not only *no* but also *sì* can be uttered in NA answers. Taken together, these results show that Italian is not strictly a P-N language for adult speakers. Though Italian RPs mostly follow such a system and thus mostly encode the absolute polarity feature, they can also encode relative polarity with *sì* used for agreeing answers and *no* used for disagreeing answers, as in A-D languages like Japanese.¹⁹ With respect to incongruent answers being present in both PD and NA answers, we would like to point out that this may be another reflection of the markedness scale, which may affect not only the realization of complete answers but also the variability in the choice of the RP (see also Andorno & Rosi (2015)). Also, remember that according to Pope (1972), the more marked a feature is, the stronger the pressure is for it to be overtly and *unambiguously* realized. Even though in negative state of affairs the production of a continuation is not required in a P-N system because no ambiguity is connected to it, things are different if the system is a more mixed one, which seems to be the case for Italian. The combination of markedness scale and the realization of both congruent and incongruent answers thus supports the presence of complete answers to negative questions: in a mixed system, an RP-only answer to negative polar questions indeed gives rise to ambiguity and hence the need to resolve such ambiguity by adding a continuation. With this result in mind, we can go back to the claim presented in

¹⁹Italian is not the only language whose RPs can encode the two types of polarity features: the same has been found about English by Kamenyana (2013), Holmberg (2015), and Maldonado and Culberston (2023).

Sections 1.2 and 1.3 regarding the fact that a bare RP answer in PD is not acceptable, because its meaning is indeterminate (Holmberg 2015) and hence gives rise to ambiguity between an agreeing and a disagreeing interpretation. This may result from the feature clash proposed in Holmberg (2015). However, this also raises the question of why we find complete answers in NA contexts, where no such feature clash should arise. A different explanation might instead be that the ambiguity stems from the fact that Italian is not strictly a P-N system but rather a more mixed one: the ambiguity of bare RP answers to negative polar questions rightly follows this observation and is more pervasive than previously thought.

Moving now to the children's results, we found that children produced mostly congruent answers in PQ (around 98% in both negative and positive state of affairs), as we expected. As for NQ/QQ questions, they produced some incongruent answers. In particular, they produced $n = 34$ incongruent answers in positive state of affairs and $n = 23$ incongruent answers in negative state of affairs (summing the incongruent RP answers in NQ and QQ). That is, just like adults, they produced incongruent answers both in positive and negative state of affairs, contrary to what we expected in a strict P-N system, and also considering the predictions based on previous results on acquisition (see Akiyama 1979, who suggested that the P-N system should be the easiest one to acquire). In contrast to adults, however, all of children's incongruent answers were RP answers. As previously discussed, incongruent RP answers may be instances of incongruent complete answers whose continuation is not pronounced or can be due to misunderstandings of the depicted story. Given that the number of unambiguously incorrect answers was very low in both children ($n = 10$) and adults ($n = 3$) and that they produced either very few ($n = 5$ in children) or no (in adults) incongruent answers in PQ, it is unlikely that instances of incongruent answers in NQ/QQ were primarily due to misunderstandings of the depicted story. Instead, it seems that children, like adults, have acquired the fact that Italian is mostly, but not strictly, a P-N language and, as a result, allow variation in the use of RPs in NA and PD answers. Further studies are nevertheless needed to disentangle these two options.

Finally, one unexpected result that we have not yet discussed concerns the difference that was found between the two types of negative questions, NQ and QQ, in adult participants. Specifically, the results of the model reported in Section 3.2 show that adults produced more incongruent answers in QQ than in NQ, suggesting that there is a difference in how participants treat these two types of negative questions. This difference may be tied to structural differences between them, due to the type of negation involved. According to Zeijlstra (2004, 2022), for instance, these two types of negation vary along two main dimensions: (i) whether the expression contributing the semantic negation is overt, as in NQ, or covert, as in QQ, and (ii) what its scope is; for Zeijlstra, *non* heads a NegP projection immediately dominating vP, whereas the covert negation operator is higher in the structure, c-commanding the subject *nessuno*. That the scope of negation (which is wider in QQs than in NQs) could have an effect on the answering of these negative questions is in line with what has been observed in other languages like English and Swedish (Holmberg 2015). However, given that, to our knowledge, this study is the first one to investigate the answering of different types of negative questions, further work systematically investigating such questions and possibly other types of negative questions, focusing on this research question, is required to understand the source of this difference.

A corollary result of our study is that the data discussed seem to support the markedness scale (Pope 1972, Roelofsen & Farkas 2015) and the hierarchy repeated here:

- (17) Positive Agreement < Negative Disagreement < Negative Agreement < Positive Disagreement

In fact, we suggest that the markedness scale can be spotted not only with (i) the use of special RPs (as in the case of French *si* in PD) and (ii) the different meanings these particles convey (as confirmed by our results for both PD and NA) but also with (iii) the production of complete answers, even in cases

where these are not necessary. With this in mind, we show that our results partially confirm the validity of the markedness scale, in both adults and children. PA and ND answers (PQ) are indeed less marked than NA and PD answers (NQ/QQ) for both adult and child participants. This result clearly emerged from the fact that children resorted exclusively to RP answers in PA and ND and that a significant effect of question types ($PQ > NQ/QQ$) emerged from the model on adults. Moreover, NA answers are less marked than PD ones in NQ/QQ: adults produced more complete answers in PD than in NA and more incongruent answers as well. As already explained, both adults and children (although at a lower rate than adults) distinguished PD answers as the more marked ones of the scale. As suggested by Pope (1972), the more marked a feature is, the stronger the pressure is for it to be overtly and unambiguously realized. Though adults mirrored this principle in their production of complete answers in PD, children may need more time to fully integrate it in their productions. The only claim that did not find any evidence in our results was the markedness of ND with respect to PA (cf. Maldonado & Culbertson 2023).

Further research is needed to replicate the current findings and explore further this phenomenon in other languages with the same answering pattern. In particular, the use of a more ecologically valid experimental setting will clarify some unexpected results reported in the present study. In parallel, replicating the current study with older children may be useful to identify the developmental acquisition of some pragmatic principles that seem to be in place in the production of answers to polar questions in children older than 6 years of age. Finally, focusing on prosodic cues of answer types (as suggested by Bernini 2001 and Rossano 2010) and adding a video recording of the participants performing the task to include nonverbal RPs in the analysis will help disentangle the questions still open to date.

5 Conclusion

This study provides new evidence on the Italian answering pattern of positive and negative polar questions, in both children and adults. To our knowledge, this is the first study that simultaneously investigates the type of answers to both positive and negative polar questions across the two populations.

Our results from adults suggest that the answering system of Italian is more complex than previously thought. In fact, we showed that Italian is mostly, but not strictly, a P-N system (see also Bernini (2001), as well as Andorno and Rosi (2015)). As in the case of English (Kameyama 2013, Holmberg 2015, Maldonado & Culbertson 2023), some languages appear to display mixed behaviors when it comes to answering negative polar questions: rather than following strictly the P-N system, speakers combine it with answers typical of A-D languages. With respect to the answer types, complete answers were uttered mostly in the PD condition, as expected. However, they were also produced in the other three conditions, namely, PA, ND, and, especially NA. We suggest that this result can be explained by a combination of factors: first, the theoretical background outlined in Section 1.2 based on Holmberg (2015); second, principles of efficient communications, and in particular Grice's (1975) Maxims of Manner and Quantity. These predict that complete answers are required only in the PD condition, whereas in other conditions they are either optional (Holmberg 2015) or redundant (Grice 1975). In addition, we claim that the markedness scale, combined with the fact that the Italian answering system is more mixed than previously thought, can account for the amount of complete answers in the other conditions: speakers may resort to additional content to avoid ambiguities, hence linking back to the Gricean Maxims.

The results from children indicate that Italian-speaking 4- to 5-year-olds are able to answer positive and negative polar questions, behaving in line with adults, although some aspects of more complex structures have yet to be fully acquired. In fact, they mostly answered with RPs across all conditions, showing that they favored the brevity component of the Maxim of Manner over the informativeness requirement of the Maxim of Quantity and the ambiguity avoidance component of the Maxim of Manner. At the same time, we have shown that they are starting to utter more complete answers in the PD condition. This suggests that they are in the process of acquiring these maxims, which are fully

mastered only at a later developmental stage, in line with previous research (Davies & Katsos 2010, Clark & Kurumada 2013, Okanda et al. 2015, Yatsushiro & Sauerland 2019). With respect to the Italian answering system, our findings show that children, like adults, mostly follow a P-N system. Some responses provided to negative questions further suggest that they allow for variation in the use of RPs in NA and PD, again like adults, thus producing answers typical of A-D languages. Nevertheless, given that most of their answers did not involve a continuation, we cannot rule out the possibility that such cases were due to misunderstandings of the depicted story. Further studies are needed to clarify this issue.

Future work extending this line of research to a broader range of languages and age groups will be essential for refining our understanding of how answering systems are acquired and represented in the grammar.

Acknowledgments

We thank all the participants, their families, and the schools in Milan for taking part in the study. We are also grateful to our student assistants, Martina Riva and Valeria Raffaelli, for their help in collecting the children's data. We further thank all members of the LeibnizDream project, Francesca Panzeri, as well as the audience at "The Romance Turn 11" for fruitful discussions and feedback. We also wish to thank three anonymous reviewers and our editor Sudha Arunachalam for their thoughtful and thorough comments which helped us improve the manuscript.

Author contributions

Chiara Dal Farra, Aurore Gonzalez, and Silvia Silleresi conceived the experimental question, designed the experiment, prepared the experimental materials, coded the data, and drafted and revised the manuscript, with the exception of Section 2.4, Section 3.1, and part of Section 3.2. Chiara Dal Farra and Silvia Silleresi also transcribed, glossed, and translated all the data. Desiré Carioti conducted statistical analyses, drafted and revised Section 2.4, Section 3.1, and part of Section 3.2 of the manuscript. Maria Teresa Guasti conceived the experimental question and provided funding. All authors approved the final version of the paper.

Disclosure statement

The authors report there are no competing interests to declare.

Funding

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 Research and Innovation Programme (LeibnizDream, Grant Agreement No. 856421).

Data availability

The study has been preregistered at https://osf.io/5acqw/?view_only=ef2edc37adc145aabace1b42751a3a3cosf.io/5acqw. All experimental materials, data, and statistical analysis scripts are available at <https://doi.org/10.5281/zenodo.17072609>.

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Glossary

Polarity features: Types of features that universally govern the use of RPs. They capture two dimensions of meaning: absolute polarity (whether the response itself has a positive or negative polarity) and relative polarity (whether the response agrees or disagrees with the preceding discourse), which can combine into four logical possibilities:

- **PA** = Positive Agreement
- **PD** = Positive Disagreement
- **NA** = Negative Agreement
- **ND** = Negative Disagreement

Answer types: Types of answers that are given to polar questions. They can be composed of multiple parts (RP and continuation), resulting in three logical possibilities: RP, continuation, complete.

- **RP** = Response particle
- **Continuation** = The clause following the RP
- **Complete** = RP + continuation

Question types: Types of polar questions. In the present study, they could be of three types: PQ, NQ, QQ.

- **PQ** = Positive polar question
- **NQ** = Negative polar question containing sentential negation
- **QQ** = Negative polar question containing a negative indefinite

State of affairs: Contexts preceding the polar questions, in which *p* is the case or not *p* is the case. They could be of two types: positive, negative.

- **positive** = a context where *p* is the case
- **negative** = a context where not *p* is the case

Congruency: Polarity of the RP with respect to the one expected in a P-N system. These can be congruent or incongruent.

- **Congruent** = when the polarity of the RP matched the one expected in a P-N system; more specifically, when participants produced *si* when the state of affairs was positive (i.e., in PA and PD) and *no* when it was negative (i.e., in ND and NA)
- **Incongruent** = when the polarity of the RP did not match the one expected in a P-N system

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