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This study develops a single elicitation method to test the acquisition of third-person pronominal objects in five-year-olds for sixteen languages. This methodology allows us to compare the acquisition of pronominals in languages that lack object clitics ('pronoun languages') with languages that employ clitics in the relevant context ('clitic languages'), thus establishing a robust cross-linguistic baseline in the domain of clitic and pronoun production for five-year-olds. High rates of pronominal production are found in our results indicating that children have the relevant pragmatic knowledge required to select a pronominal in the discourse setting involved in the experiment as well as the relevant morphosyntactic knowledge involved in the production of pronominals. It is legitimate to conclude from our data that a child who at age 5 is not able to produce any or few pronominals is a child at risk for language impairment. In this way, pronominal production can be taken as a developmental marker, provided that one takes into account certain cross-linguistic differences discussed in the paper.

1. Introduction

In this study, we explore the acquisition of pronominal objects in sixteen languages. The comprehension of pronominal elements has been intensively studied in a variety of typologically diverse languages. These studies indicate that, in some languages, young children interpret pronominals differently from adults. A clear asymmetry has been found between the interpretation of pronouns and clitics, however. Children allow a local interpretation of the personal pronoun, whereas they interpret clitics in a target-like manner, i.e. not allowing a local antecedent for the (non-reflexive) clitic, already at the age of 3 (Chien & Wexler, 1990; McKee, 1992; Baauw, Coopmans, & Philip, 1999; Varlokosta, 2000, among others). The comparison between pronouns and clitics in production has not received as much attention. Specifically, third-person object pronominal elements have been studied mainly in clitic languages (that is, languages that have clitics in addition to non-clitic pronominal

elements), without comparison to pronoun languages (languages lacking clitic pronouns) (but see Bloom, 1990; Grüter, 2006, 2007; Pérez-Leroux, Pirvulescu, & Roberge, 2008a, for a comparison between clitic and pronoun languages). These studies have not always used the same methods; for example, some of the results for some of the languages stem from spontaneous speech, which is not directly comparable to data from elicitation tasks.

Here, we developed a single elicitation method which was used to test the acquisition of third-person pronominal objects in five-year-olds for sixteen languages.[1] This allowed for a direct comparison of languages that differ in how they express pronominal arguments. This methodology allowed us to compare the acquisition of pronominals in languages that lack object clitics ('pronoun languages') with languages that employ clitics in the relevant context ('clitic languages'), thus establishing a robust cross-linguistic baseline in the domain of clitic and pronoun production at the same stage of language development.[2] This is particularly important given the relevance of clitic production to detecting specific language impairments (SLI). Omission of third-person clitics or lack of clitic production in obligatory contexts has been claimed to be a clinical marker of SLI in French (e.g., Paradis, Crago, & Genesee, 2003), Greek (Stavrakaki & van der Lely, 2010; Tsimpli & Stavrakaki, 1999; but, for different claims, see Manika, Varlokosta, & Wexler, 2011; Varlokosta, Konstantzou, & Nerantzini, 2014), and Italian (Bortolini *et al.*, 2006). We do not know whether such omissions are limited to clitics or extend to all types of pronominals. In fact, differences in the expression of pronominal direct objects across several linguistic dimensions might lead to different performance in their production in typical and atypical language developing children. These differences between clitics and pronouns can be found at the phonological, morphological, syntactic, and semantic levels (Kayne, 1975; Zwicky, 1977). On the phonological side, clitics are unstressed monosyllabic elements, in contrast to pronouns, which may receive stress and can include more than a single syllable. As for their acquisition, according to some theories, less salient phonological elements may be harder to acquire (Gerken, 1996; Vanderweide, 2005). This approach would predict better production of (stressed) pronouns compared to clitics. At the morphological level, object clitics are typically homophonous with definite articles, or are otherwise related to a full pronominal form. Additionally, at the syntactic level,

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[1] Our choice for testing only 5-year-olds was determined by the fact that our objective was to discover suitable test methods that can be used for diagnosing language problems and impairment in children of school-entry (i.e. age 5 to 6) in these 16 languages, since at the age of school-entry, an assessment of language problems and impairment has great practical importance.

[2] Clitics and pronouns have the same pragmatic function because they have the same information structure status: they are used as anaphoric forms when the antecedent is clear from the context. In Gundel, Hedberg, and Zacharski's (1993) *Givenness Hierarchy*, elements that are in focus (in a given discourse) are highest on the hierarchy. These are expressed as pronouns in pronoun languages and clitics in clitic languages.

clitics are heads that cannot stand on their own and need to attach to an appropriate host. A further syntactic difference among pronominal elements relates to their distribution: pronouns have the same distribution as full nominals (DPs), whereas clitics need a 'special position', depending on the above-mentioned "appropriate host" — this can be the inflected verb (leading to pre-verbal *proclisis* or post-verbal *enclisis* in the languages included in our study) or another element (such as the second-position clitics found in many Slavic languages). Object clitics can thus occupy a position different from that of canonical object DPs. On the semantic side, clitics may refer to human and non-human or non-animate objects, while pronouns typically refer to humans/animate.

These differences have lead Cardinaletti and Starke (1999) to propose a tripartition into clitic, weak, and strong pronouns across languages. An essential feature of this tripartition is that weak pronouns have an intermediate status between strong pronouns and clitics. Like strong pronouns, they fill syntactic positions reserved for maximal projections in the clause structure (DP positions for direct object pronouns), whereas clitics ultimately fill a head position (they incorporate within the inflected verbal head in Romance, for example). Like clitics, phonologically weak pronouns do not carry independent stress (as mentioned above). Hence, weak pronouns may be seen as phonological clitics, but not as syntactic clitics, which have a head status. As indicated by Germanic languages (such as German), strong and weak pronouns may be largely homophonous. Hence, their distinction is only detectable through their different syntactic and phonological behavior. Without committing ourselves to any specific analysis of cliticization (see Belletti, 1999; Sportiche, 1996, among others), we can safely assume that pronominal clitics may be considered the weakest form of pronouns in that at the end of the cliticization process the clitic ultimately is a head and incorporates/forms a word with the verb which hosts it. In contrast, both weak and strong pronouns maintain the distribution of a maximal projection, and, thus, can be considered less weak in the relevant sense. In this article we will consider clitics and pronouns, without capitalizing on the further weak/strong partition, as the relevant distinction in the test utilized ultimately hinges on the head vs. maximal projection status of the pronominal element. The tripartition proposed by Cardinaletti and Starke (1999) has been challenged theoretically by Gabriel and Müller (2005) and empirically by Schmitz and Müller (2008), who show that within the group of clitic pronouns a distinction must be made with respect to their complexity, which allows to explain acquisition asymmetries between subject and object clitics in French. However, given that the research reported in this paper is about direct object clitics, we do not address this issue further, since this would take the discussion too far afield, as the issues concerning subject

clitics in French are rather complicated (see Hamann & Belletti, 2006 for further relevant discussion).

Previous studies on clitic production lead to the following generalizations:

A.   *Children omit clitics in some languages.*

Broadly speaking, clitic omission up to at least 4 or 5 years is found to different extents for Catalan (Wexler, Gavarró, & Torrens, 2004; Gavarró, Torrens, & Wexler, 2010), (European) Portuguese (Costa & Lobo, 2006), French (Jakubowicz *et al.*, 1996; Hamann *et al.*, 1996, Jakubowicz & Rigaut, 2000), Italian (Schaeffer, 1997), and Spanish (Fujino & Sano, 2002), as well as bilingual Spanish in contact with Basque (Ezeizabarrena, 1996; Larrañaga, 2000; Larrañaga & Guijarro-Fuentes, 2011). In other languages, such as (Standard Modern) Greek (Tsakali & Wexler, 2003), Romanian (Babyonyshev & Marin, 2006), Serbo-Croatian (Ilic & Ud Deen, 2004), and possibly Spanish (Wexler, Gavarró, & Torrens, 2004; Gavarró, Torrens, & Wexler, 2010), children were found not to omit clitics from age 2, but see the discussion below.

B.   *Children tend to place their clitics in the correct position from the onset of clitic production.*

For instance, Guasti (1993/1994) shows that Italian children place clitics pre-verbally in declarative sentences, but post-verbally in imperative and non-finite contexts in a target-like way. Similar findings have been reported for other languages in which proclisis is the dominant pattern for clitic placement (e.g., Marinis, 2000, for Greek; Ezeizabarrena, 1996, 1997, for Spanish; Wexler, Gavarró, & Torrens, 2004, for Spanish and Catalan). As for predominantly enclitic languages, such as European Portuguese and Cypriot Greek, children are known to make placement errors, generalizing the post-verbal position for clitics arguably beyond age three and a half (cf. Duarte & Matos, 2000, for European Portuguese; Petinou & Terzi, 2002, for Cypriot Greek).

The data collected so far for all of these languages allow for some conclusions to be drawn regarding the nature of the problems in the acquisition of clitics. First, when children omit clitics, they do not do so because of the phonological deficiency of these forms. As shown in Jakubowicz *et al.* (1998), children omit accusative clitics in French, but do not omit determiners with the exact same phonological form. Clitics are phonologically similar across languages, yet they are omitted only in some of the clitic languages.

Second, the rate and nature of clitic omission may be language-specific. For this reason, it is important to determine in which languages clitics are actually omitted, and at what rate.

Take Spanish, for instance: while Wexler, Gavarró, and Torrens (2004) claim that there is very little or no omission of clitics in the language, Castilla *et al.* (2008) contend that there is some, although the variety of Spanish examined in the two studies is not the same; the former is a study of continental Spanish and the latter of Columbian Spanish.[3] Similar lack of consensus on the status of omission within a language exists for Romanian (Avram, 1999, 2001; Babyonyshev & Marin, 2006) and French (Jakubowicz *et al.*, 1998; Pérez-Leroux *et al.*, 2008b). These different results — even for the same language — may stem from the fact that the data have been collected with different methodologies or come from different sources (spontaneous speech vs. experiments). One has to be cautious about a direct comparison between languages when the methods used were not exactly the same; in other words, it is not entirely clear if one can say that languages differ with respect to the acquisition of clitics on the basis of data gathered with different methodologies.

As for object pronouns, good production has been reported in elicitation studies for English (de Villiers, Cahillane, & Altreuter, 2006, but see Hyams & Wexler, 1993 and Valian, 1991, for evidence from spontaneous data that there is little object omission in English before the age 4;6), Dutch (Spenader, Smits, & Hendriks, 2009), and Hebrew-speaking children (Ruigendijk *et al.*, 2010; Novogrodsky *et al.*, 2010), but relatively high levels of omission have been observed for German-speaking children (Jakubowicz *et al.*, 1996, 1997; Ruigendijk *et al.*, 2010).

For the purposes of this study, we asked the following research questions:

What is the pattern of third-person object pronominal production at the age of 5 years, when children who acquire different languages are tested with the same methodology? In particular:

(Q1) Are pronouns produced better than clitics or vice versa?

(Q2) Is there a difference in clitic placement errors for languages with different clitic positions?

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[3] Research by Fujino and Sano (2002), Ezeizabarrena (1996, 1997), Larrañaga (2000), and Larrañaga and Guijarro-Fuentes (2011) suggests that there is more omission, based on naturalistic longitudinal corpora. However, the obligatory contexts for clitic production in naturalistic data are often few or include different kinds of clitics, such as first, second, and third-person pronominal clitics or reflexive clitics; thus, the conclusions based on naturalistic data should be read with caution. Moreover, the (Basque Region in the North of Spain) Spanish variety of some of the children studied in Ezeizabarrena (1996, 1997), Larrañaga (2000), and Larrañaga and Guijarro-Fuentes (2011) permits null objects in some environments (see Franco & Landa, 2003).

We will use the term 'pronoun' to cover both weak and strong pronouns.[4]

This article is structured as follows. Section 2 provides the relevant background concerning existing research on clitic and pronoun production tasks with young children, followed up in section 3 by cross-linguistic issues of clitic placement, and core properties of the languages included in the study, divided into clitic languages and pronoun languages. In section 4, the methodology of the experimental task is described in detail and results are presented in section 5. Section 6 contains the discussion of the findings.

2. Background: Clitic and Pronoun Elicited Production Studies

Experiments eliciting production of accusative clitics have been carried out in several languages. As mentioned above, the results reported in the literature show a great deal of heterogeneity, across languages, but also for the same language, and even in the same age range for a given language. Most of these studies have been undertaken on 2, 3, 4 and 5-year-old children. Table 1 lists elicited production experiment results by age of the children studied, by particular study and by language, including Catalan, French, Greek, Italian, Portuguese, Romanian, and Spanish. The results are summarized in three rates: rate of clitic production (including clitics produced with agreement errors), rate of object omission, and rate of production of full, lexical DPs.[5]

From Table 1, we see that in some languages clitic production (the first rate provided in the grey cells) is quite high from very early on (for example, in Greek); in other languages this rate is initially quite low (Catalan, French, Italian, and Romanian). Clitic production appears to remain low for some time in French and in Portuguese, though different studies show quite different rates for clitic production in French, even at age 3 and 4. This wide variation in results for French continues in the studies of older children, ranging from just above 50% to well over 90% in 5 and 6-year-olds. Extremely varying rates of clitic production (and DP production and omission) are reported for Spanish elicited production experiments throughout the ages studied, with rates ranging from 45% to 100% in children aged 3 and 4. While, at first glance, differences in rates might be taken to be related to

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[4] Most studies for different languages have focused on third-person accusative clitics only. Little is known concerning the acquisition of other clitics and pronouns in most languages. Some exceptions are Babyonyshev and Marin (2006) for dative clitics in Romanian, Jakubowicz *et al.* (2002) for reflexive clitics in French, Costa *et al.* (2008) for dative and reflexive clitics in all persons in European Portuguese, Ezeizabarrena (1996) for the production of first and second-person Spanish clitics and pronouns from age 1;6 to 4, Gavarró and Mosella (2009) for indirect object clitics in Catalan, Novogrodsky *et al.* (2010) for reflexive pronouns in Hebrew, and Ruigendijk *et al.* (2010) for reflexive pronouns in Hebrew and German.

[5] Note that these three rates often do not add up to 100%, as children also produced other answers irrelevant to clitic production.

Table 1. Elicited production of accusative clitics in children aged 2, 3, 4, 5, and 6: Age x Language x Study (mean age, age range, and N of children; % clitics, % omission, and % full DPs)

	Catalan	French	Greek	Italian	Portuguese	Romanian	Spanish
2-year-olds	**W, G, & T 2004:** 2;3 (1;10-2;11) N=8 — 18% 79% 3%	**J & R 2000:** 2;4 (2;0-2;5) N=5 MLU<3 — 0% 62% 20% / **J & R 2000:** 2;5 (2;4-2;7) N=7 MLU>3 — 21% 9% 47%	**T & W 2004:** 2;4-3;0 N=15 — 99% 1% 0%	**S 2000:** 2;5 (2;1-2;6) N=5 — 22% 64% 14% / **T 2009:** 2;7 (2;4-2;10) N=5 — 14% 59% 27%		**B & M 2006:** 2;5 (2;0-2;11) N=12 — 38% 60% 2%	**B & L 2001:** (2;4-3;10) N=15 — NA 13% NA / **W, G, & T 2004:** 2;8 (2;6-2;11) N=8 — 90% 8% 2%
3-year-olds	**W, G, & T 2004:** 3;6 (3;0-3;11) N=11 — 70% 22% 8%	**J & N, to appear:** 3;2 N=12 — 39% 33% 20% / **P-L, P, & R 2008b:** 3;5 (3;0-3;10) N=10 — 13% 35% 51%	**S, E, S, & V 2008:** 3;6 (2;10-4;3) N=9 — 94% 4% <2% / **M, V, & W 2011:** 3;10 (3;1-6;0) N=27 — 96% NA NA	**S 2000:** 3;5 (3;1-3;11) N=11 — 62% 15% 23% / **T 2009:** 3;7 (3;2-3;11) N=14 — 86% 14% 0%	**C & L 2006:** 3;6 (2;7-3;11) N=14 — 13% 72% 15% / **C, L, C, & S 2008:** 3;7 N=24 — 13% 67% 0%	**A 2001:** NA (2;0-4;0) N=11 — NA 28% NA / **B & M 2006:** 3;6 (3;4-3;10) N=13 — 93% 7% 0% / **A 2001:** NA (2;1-5;0) N=14 — NA 31% NA	**W, G, & T 2004:** 3;7 (3;5-3;11) N=10 — 98% 0% 1% / **C 2009:** 3;0 (2;9-3;3) N=39 — 45% 22% 4% / **C & P 2010:** 3.0 (NA) N=34 — 33% 25% 1%
4-year-olds	**W, G, & T 2004:** 4;7 (4;3-5;1) N=12 — 96% 4% 0%	**C et al. 2006:** 4;0 (3;5-4;5) N=18 — 69% 21% 9% / **J & N, to appear:** 4;2 N=12 — 78% 9% 10% / **P-L, P, & R 2008b:** 4;3 (4;1-4;8) N=10 — 42% 26% 31% / **C et al. 2006:** 4;9 (4;6-4;11) N=20 — 88 % 9% 3%	**S & L 2010:** 4;4 (3;11-5;3) N=17 — 97% NA NA	**S 2000:** 4;6 (4;1-4;10) N=10 — 89% 0% 11% / **T 2009:** 4;4 (4;2-4;10) N=10 — 86% 12% 2%	**C & L 2006:** 4;4 (4;0-4;9) N=7 — 23% 68% 9%		**W, G, & T 2004:** 4;7 (4.3-5.1) N=12 — 100% 0% 0% / **C & P 2010:** 4.0 (NA) N=39 — 62% 15% 1%

	Catalan	French	Greek	Italian	Portuguese	Romanian	Spanish
5-year-olds		**P-L, P, & R 2008b:** 5;2 (5;0-5;5) N=9 53% 12% 30% **C et al. 2006:** 5;3 (5:0-5;6) N = 19 89% 6% 5% **J, N, R, & G 1998:** 5;7 (5;6-5;11) N=20 79% 4% 17% **C et al. 2006:** 5;9 (5;7-5;11) N=22 94% 4% 2%	**S, E, S, & V 2008:** 5;10 (4;11-5;11) N=9 96% 4% 0% **S & L 2010:** 5;1 (4;2-6;2) N=18 97% NA NA	**S 2000:** 5;6 (5;0-5;11) N=9 91% 0% 9%	**Si 2008:** 5;6 (5;0-5;11) N=21 63% 20% 13%		**C & P 2010:** 5.0 (NA) N=30 73% 13% 0%
6-year-olds		**C et al. 2006:** 6;3 (6;0-6;5) N =20 90% 3% 7% **T et al., 2011:** 6;7 (6;1-6;1) N=24 70% 10% 12% **G 2005:** 6;7 (6;2-7;1) N=12 73% 7% 7% **J & N, to appear:** 6;8 N=12 93% 0% 7%	**S & L 2010:** 6;2 (4;7-8;3) N=12 98% NA NA		**Si 2008:** 6;3 (6;0-6;5) N=10 69% 20% 6%		

A (Avram, 2001); B & L (Bedore & Leonard, 2001); B & M (Babyonyshev & Marin, 2006); C (Castilla, 2009[16]); C & L (Costa & Lobo, 2006); C, L, C, & S (Costa, Lobo, Carmona, & Silva, 2008); C et al. (Chillier-Zesiger, Arabatzi, Baranzini, Cronel-Ohayon, & Thierry, 2006); G (Grüter, 2005[17]); J & R (Jakubowicz & Rigaut, 2000); J & N (Jakubowicz & Nash, to appear); J, N, R, & G (Jakubowicz, Nash, Rigaut, & Gerard, 1998); M, V, & W 2011 (Manika, Varlokosta, & Wexler, 2011); P-L, P, & R (Pérez-Leroux, Pirvulescu, & Roberge, 2008b[18]); S (Schaeffer, 2000); Si (Silva, 2008); S, E, S, & V (Smith, Edwards, Stojanovik, & Varlokosta, 2008); S & L (Stavrakaki & van der Lely, 2010); T (Tedeschi, 2009); T & W (Tsakali & Wexler, 2004); T et al. (Tuller, Delage, Monjauze, Piller, & Barthez, 2011); W, G, & T (Wexler, Gavarró, & Torrens, 2004). NA (data not available)

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[16] Colombian Spanish.
[17] Canadian French.
[18] Canadian French.

differences in the dialect of the particular language under investigation (Colombian Spanish versus Iberian Spanish, or Canadian French versus continental French), closer examination shows that varying rates are found for the same variety of a language, particularly for French (e.g. Jakubowicz & Rigaut, 2000, for 2-year-olds; Chillier-Zesiger *et al.*, 2006, for 4-year olds; Chillier-Zesiger *et al.*, 2006 vs. Tuller *et al.*, 2011, for 6-year-olds). Notice also that the rates of clitic omission and production of a full DP also vary considerably from study to study, including studies of the same age range and the same language (Italian: Schaeffer, 2000 vs. Tedeschi, 2009, for 3-year-olds; Romanian: Babyonyshev & Marin, 2006 vs. Avram, 2001, for 3-year-olds). Sorting out which of all these differences are genuine is extremely difficult. Not only are the SDs that accompany these means often very high (see references cited), and the number of participants in some of them very small, but, more importantly, different tasks were used.

Concerning experimental methodology, in the first studies conducted, the child was shown some pictures, and prompts used to elicited clitic production were like that exemplified in (1):

(1)   What is X doing to/with Y?

This was the method used by Jakubowicz and collaborators in various studies, by Avram (1999), and, subsequently, by Smith *et al.* (2008), Stavrakaki & van der Lely (2010), and Tuller *et al.* (2011). In Chillier *et al.* (2006) and Castilla (2009) the same kind of prompt was preceded by a short story, building up to the outcome, as in (2):

(2)   It's late, it's time to go to bed, there's a blanket. What is papa doing to Pierre?'

        Schaeffer (1997, 2000) modified this method and introduced a second experimenter:

(3)   Experimenter 1: –What's X doing?
        Experimenter 2: – I know what he is doing: he is verbing Y.
        Experimenter 1: – No, he's not. You tell us: What is X doing to Y?

Schaeffer's method was adopted by Babyonyshev and Marin (2004), Tsakali and Wexler (2004), Wexler *et al.* (2004), Costa and Lobo (2006, 2007), Pérez-Leroux *et al.* (2008b), and Manika *et al.* (2011).

Bedore and Leonard (2001) resorted to a completion task, as exemplified in (4):

(4)   Experimenter: The children wash the car and then…
       Child: [they] it-push.

All these elicitation methods share the property of focusing on the verb, and rendering the object referent as part of the background knowledge. However, they differ in the degree to which the direct object referent is a well-established topic. The more salient the direct object is in the discourse, the more likely it will be pronominalized, as opposed to being produced as a full DP. On the other hand, in languages with a null object option, null objects are also more likely to occur in this kind of context. Schaeffer's method appears to have been particularly successful in eliciting pronominal answers instead of full DPs. Another feature all of these experiments have in common is the fact that they not only elicit a direct object pronoun, but they also elicit a subject pronoun. For Catalan, Greek, Italian, Portuguese, Romanian, and Spanish, which are all (subject) pro-drop languages, this simply means that the elicited answer will consist of the object clitic and the verb. In French, however, the elicited answer requires production of a nominative clitic followed by an accusative clitic (a clitic cluster) followed by the verb.

Further variations in the elicitation method occur as a result of other language-specific properties. Thus, Costa and Lobo (2006) and Costa *et al.* (2008) added a strong island condition, for reasons that are reviewed in Section 4. These experiments differ also as to the other elements that were elicited besides definite third-person accusative clitics: Some experiments included items eliciting reflexive clitics, or first or second-person accusative clitics, and Pérez-Leroux *et al.* (2008b) and Tedeschi (2009) included a "non-individuated" condition (with a prompt, after correction as in the Schaeffer method, of 'What did X do?' eliciting an answer containing a new event 'Bertrand is eating (the bone)'). Experiments with multiple conditions could be argued to increase task difficulty, as, in any given condition, the child is in the position of having to inhibit responses that are readily present due to another experimental condition being present in the task.[6]

Elicited production experiments specifically focused on how well children produce object pronouns are rather sparse. Jakubowicz *et al.* (1996, 1997) found that object omission

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[6] Further discrepancies in the results are found in the studies using repetition (Eisenchlas, 2003) or based in spontaneous production, in which the criteria for determining when a clitic should be expected vary from study to study (see the results in Guasti, 1993/94; Lyczkowski, 1999; Fujino & Sano, 2002; Gavarró *et al.*, 2006; Pirvulescu, 2006, etc).

is very frequent in the elicited production of German 2 and 3-year-olds with MLUs below 3 (50% in 3 children with MLU < 3 in Jakubowicz *et al.*, 1996; 55% in 7 children with MLU < 3 in Jakubowicz *et al.*, 1997) and these omissions often result in target-deviant constructions.[7] Ruigendijk *et al.* (2010) found also relatively high levels of object omission in an elicitation experiment using pictures ('Here the woman wets the girl down, and what does the woman do to the girl here? (she) dries/towels her) with German-speaking 3, 4, 5, and 6-year-olds (omission rates of 23%, 9%, 7%, and 10%, respectively, and pronouns produced at 40%, 55%, 76%, and 58%, and DPs at 3%, 13%, 9%, and 24%). These results for German pronouns are in contrast with studies on pronoun production of English, Hebrew and Dutch-speaking children. De Villiers *et al.* (2006) observed nearly flawless production of pronouns, in their elicited production study, with English-speaking children between 4;6-7;2 years old (mean age 6;3).[8] Similarly, in their elicited production experiment, Ruigendijk *et al.* (2010) and Novogrodsky *et al.* (2010) found that Hebrew-speaking children produced very few omissions (4%, 13%, 2%, 4%, and 4% in 2, 3, 4, 5, and 6-year-olds, respectively) and pronouns were produced at rates of 70% for the 2 and 3- year-olds, and 87-92% for the 4-6 year-olds (while DPs were generally marginal – 3-7%). Finally, Spenader *et al.* (2009) report that Dutch-speaking children aged 4;5 to 6;6 (mean age 5;5) exhibited flawless pronoun production as they rarely produced reflexives instead of pronouns in the conditions that targeted a pronoun response (the focus of this study was on the difference between pronouns and reflexives). However, it is worth noting that in some of these conditions children produced a high proportion of full DPs rather than pronouns. This choice was natural because their contexts presented two equally focused antecedents, and so using a pronoun would in fact be confusing. Table 2 illustrates the elicited production data from studies that provided details (Jakubowicz *et al.*, 1996; Ruigendijk *et al.*, 2010; Spenader *et al.*, 2009).

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[7] Similar conclusions are reached by Jakubowicz *et al.* (1996, 1997) on the basis of spontaneous language samples, as well.

[8] Although Hyams and Wexler (1993) and Valian (1991) report object omission in English before the age 4;6 (between 1;1 to 2;8 years; Valian,1991; between 1;6 to 3;0 years; Hyams & Wexler, 1993) on the basis of spontaneous data, both studies find that the level of object omission is not high compared to the level of subject omission observed in the same period. For example, in Hyams and Wexler (1993), the proportion of missing subjects in Adam's (between 2;5 to 3;0 years) and Eve's (between 1;6 to 2;1 years) speech is 48%, compared to 8% of missing objects in the early period, and 22% compared to 8%, respectively, in the late period.

Table 2. Elicited production of object pronouns in children aged 2, 3, 4, 5, and 6: Age x Language x Study (mean age, age range, and N of children; % pronouns, % omission, and % full DPs)

	Dutch	*German*	*Hebrew*
2-year-olds		**J *et al*. 1996:** 2;9 (2;5-3.1) N=3, MLU<3 5% 50% 45% 2;6 (2;6-2.9) N=3, MLU>3 55% 15% 30%	**R *et al*. 2010:** 2;8 (2;4-2;11) N= 7 70% 4% 7%
3-year-olds		**R *et al*. 2010:** 3;6 (3;1-3;9) N= 12 40% 23% 3%	**R *et al*. 2010:** 3;5 (3;1-3;9) N= 14 70% 13% 4%
4-year-olds		**R *et al*. 2010:** 4;6 (4;1-4;11) N= 11 55% 9% 13%	**R *et al*. 2010:** 4;5 (4;0-4;10) N= 15 87% 2% 4%
5-year-olds	**S *et al*. 2009** 5;5 (4;5-6;6) N= 83* 34% NA% 38%	**R *et al*. 2010:** 5;6 (5;1-5;11) N= 11 76% 7% 9%	**R *et al*. 2010:** 5;6 (5;3-5;10) N= 14 89% 4% 5%
6-year-olds		**R *et al*. 2010:** 6;4 (6;1-6;8) N= 10 58% 10% 24%	**R *et al*. 2010:** 6;4 (6;2-6;7) N= 10 91% 3% 4%

R *et al*. (Ruigendijk, Friedmann, Novogrodsky, & Balaban, 2010); S *et al*. (Spenader, Smits, & Hendriks, 2009); J, M, K, R, & R (Jakubowicz, Müller, Kang, Riemer, & Rigaut, 1996); NA (data not available).

*Data for different age groups are not available.

To sum up, studies of elicited production of accusative clitics with 2 to 6-year-old children show a great deal of heterogeneity, in methodology and in results, across languages and within languages. Overall, it has been reported that accusative clitic production is quite high in some languages from very early on (for example, in Greek), while in other languages this rate is at least initially quite low (for example, in Catalan, French, and Italian). Studies of elicited pronoun production are quite few in number and their results are often inconsistent: high rates of object omission are observed in some of them, while very few omissions are reported in others.

3. Summary of the Salient Distributional Properties of Pronominals in Clitic and Pronoun Languages

In this section, we list some of the most salient distributional properties of the pronominal systems of the languages tested in our cross-linguistic experiment.

Clitic languages are those languages which have clitic pronouns in addition to (strong and/or weak) pronouns. The eleven clitic languages in our sample are Cypriot and (Standard Modern) Greek, six Romance languages: Catalan, (European) Portuguese, French, Italian, Romanian, and Spanish, and three Slavic languages: Croatian, Polish, and Serbian. We will

only discuss third-person accusative clitics/pronouns, as these are relevant for the elicitation task we have created.

In all Romance languages and in (Cypriot) Greek, third-person clitics are usually homophonous to definite determiners. Third-person singular clitics inflect for gender, number, and case. Regarding placement, proclisis is generally observed with finite verbs and enclisis with non-finite ones and with affirmative imperative. Exceptions are Portuguese and Cypriot Greek, where proclisis is syntactically determined. In French, proclisis is also observed with non-finite verbs. With negative imperative, proclisis or enclisis is observed depending on the verbal form used to express the imperative; in Italian, infinitives are used and both enclisis and proclisis are possible; in Catalan and Spanish, the subjunctive is used and proclisis is evident; in French, the clitic is proclitic in negative imperative (featuring the same order as with infinitives); in Romanian, clitics are preverbal in infinitival structures introduced by *a*, and the clitic *o* is pre or post-verbal depending on the verb form. In Italian, French, and Catalan, a clitic preceding the past participle triggers participle agreement (agreement is not always audible in French or used when audible). In addition to clitics, null objects are allowed in Portuguese, but these are not possible in island contexts, like adverbial clauses. Some instances of null objects are observed in French, but no island restriction applies in this case and these instances of null objects appear to be lexically determined. Null objects are also allowed in some environments (i.e. for inanimate objects) in Basque Spanish (see Franco & Landa, 2003). In Catalan, Portuguese, Italian, and Spanish, clitic climbing is (optionally) observed with auxiliaries and restructuring verbs. Romanian (and some varieties of Spanish) have clitic doubling, and finally, in Portuguese, mesoclisis (with future and conditional) is found (for clitics in (Cypriot) Greek, see Agouraki, 1997; Anagnostopoulou, 1994; Terzi, 1999; for clitics in the Romance languages, see Belletti, 1999; Kayne, 1991; Sportiche, 1996; Uriagereka, 1995). In Slavic languages, like Croatian and Serbian, clitics occur in second position and enclitic placement is typical. In Polish, clitics tend to occur in second position, but they can be placed at different positions as well, due to the relatively free word order of the language; clitics are canonically enclitics, but there is a tendency to find them in different positions (e.g., as proclitics) (for clitics in the Slavic languages, see Bošković, 2001; Browne, 1974; Dimitrova-Vulchanova, 1999, Franks, 2010; Franks & Holloway King, 2000).

The five pronoun languages in our sample include four Germanic languages: German, Dutch, Danish, and English, and the Semitic language Hebrew (see for Germanic languages, Cardinaletti, 1999, Cardinaletti & Starke, 1999; Laenzlinger & Shlonsky, 1997; Schaeffer, 2000; Zwart, 1991; for Hebrew, Friedmann, 2007). All of these languages have strong and

weak pronouns, where the difference is mainly in terms of presence versus absence of stress. Pronouns generally inflect for gender, number, and case. They are typically positioned where full DPs appear.[9] In Dutch and German, pronouns scramble, while this process is more restricted for full DPs. Thus, in Dutch main clauses, pronouns appear right-adjacent to the finite verb in verb-second position, and in embedded clauses, they appear right-adjacent to the subject. In German, pronouns in embedded clauses appear after the complementizer (second position or Wackernagel position),[10] while in main clauses they are not necessarily adjacent to the verb in the second position.

4. Methodology

4.1 Participants

The participants were children with no diagnosed language, hearing, or speech pathologies. All participants were monolingual native speakers of the language they were tested in. Generally, 20 children were tested for each language. The number of children, their ages, and their genders are presented for each language in Table 3. We tested kindergarten and pre-school children aged 5;0–5;11.

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[9] In Hebrew there are certain distributional differences between pronouns and full DPs. Specifically, unlike full DPs, pronouns cannot appear post-verbally after an unaccusative verb (Friedmann, 2007).

[10] It is actually weak/unstressed pronouns that appear after the complementizer in embedded clauses (Müller, 2001; Grohmann, 1997; Laenzlinger & Shlonsky, 1997).

Table 3. Participants' information per language

Language	N	Age range (months)	Mean age (months)	SD age (months)	Girls	Boys
Catalan	20	61-70	65	3	10	10
Croatian	25	60-70	63	3	12	13
Cypriot Greek	24	60-72	67	4	13	11
Danish	23	59-62	64	5	13	10
Dutch	20	61-72	67	4	12	8
English	19	63-71	67	3	11	8
French	25	62-70	66	3	13	12
German	22	59-69	64	3	11	11
Greek	20	60-71	65	4	11	9
Hebrew	21	59-71	64	4	8	13
Italian	20	61-71	67	4	6	14
Polish	31	61-71	68	3	15	16
Portuguese	20	60-71	66	3	13	7
Romanian	20	61-72	65	3	11	9
Serbian	25	60-71	67	3	10	15
Spanish	23	60-68	64	2	12	11

In order to establish what the target situation was, we also tested adult native controls in each language: Catalan (27 adults), Croatian (10 adults), Cypriot Greek (8 adults), Danish (8 adults), Dutch (15 adults), English (5 adults), French (10 adults), German (8 adults), Greek (10 adults), Hebrew (10 adults), Italian (13 adults), Polish (12 adults), Portuguese (10 adults), Romanian (12 adults), Serbian (10 adults), and Spanish (20 adults). This was particularly necessary for the languages in which the use of pronominals may be complicated by the presence of some other option (e.g. null objects are an option in European Portuguese or in French, although under different conditions).

4.2 Task and procedure

To elicit object pronominals, we used a picture and a question that triggered a reply with a *because*-clause containing a pronominal. The context strongly favors the use of a pronominal by making the antecedent very salient in the discourse. First, a picture was presented in which one animate character was performing an action on another character or object. The experimenter described the picture in a sentence and then asked the child a *why*-question. For

example, for Figure 1 below, the experimenter's introduction and the target sentence are given in (5). The corresponding introductions and target clauses for this test item are provided for all languages in Appendix A.

Figure 1. Sample test picture

(5)   *Experimenter*:   "The boy is spraying the cat and the cat is wet. Why is the cat so wet? The cat is wet…"

   Target response: "… because the boy is spraying him."

The use of the *because*-clause was motivated by one of the tested languages, Portuguese, which allows for null objects, but not inside syntactic islands. To create a context in which a pronominal is required (and a null object is ungrammatical) — even in Portuguese — we employed a strong island, introduced by *because*. In such a context, according to Raposo (1986) and Costa and Lobo (2006), null objects are ruled out; see example (6) from Costa and Lobo (2006).

(6)   A: E a Maria?

       what about Maria

       B: O Pedro está triste porque o Zé *(a) beijou.

             the Pedro is sad because the Zé her$_{CL}$ kissed

The test started with two training items, which targeted object clitics or pronouns.

Clitics or pronouns were provided by the experimenter if the child did not produce them. No further feedback was provided once the experimental session started.

Each participant was tested individually in a quiet room in the kindergarten/school or at home. No time limit was imposed during testing, and no response-contingent feedback was given by the experimenter, only general encouragement. The sessions were tape-recorded and transcribed in full during the testing as well as after the test, by native speakers.

4.3 Materials

One of the most challenging tasks was to find a list of strongly transitive verbs that suited all the languages studied and that could be used in sentences with direct objects. We specifically chose verbs for which transitivity was not lost in the translation/adaptation across languages. The list of the verbs used, short descriptions of the pictures, and the lead-in sentences for the English experiment are presented in Appendix B. The list of the verbs used in the 16 languages are listed in Appendix C.

The target sentences included singular pronouns of various genders (feminine, masculine, and neuter, where applicable). Our pilot studies revealed that the gender of the target pronominal element did not have any effect on clitic/pronoun production, and thus we decided not to balance for gender in the final testing, as this would have been very difficult, since gender is very idiosyncratic across languages.

The pictures were controlled for cultural appropriateness. Before final testing, several pilot studies were run to ensure that the pictures were clear and the verbs were appropriate. After piloting, we changed some pictures and verbs that had elicited non-target responses in some of the languages, typically indirect objects and descriptions that did not use the target verb.

The test included 12 test sentences and 5 fillers. The fillers targeted sentences without object pronouns.

4.4 Scoring

In clitic languages, we expected children to produce clitics and, in pronoun languages, we anticipated use of pronouns (strong or weak). We did not distinguish between weak and strong pronouns, as it was rather difficult to distinguish them consistently across different languages; thus, weak and strong pronouns are collapsed together in the scoring. Alternative responses found in the data were categorized in the following categories: use of the

corresponding full noun phrase (DP), failure to produce any direct object (i.e. omission), use of pronouns in clitic languages, and production of other responses.

We also scored errors of gender, number, and case. Sometimes participants changed the target verb, but employed a verb that still required a direct object. These were not counted as errors as long as a clitic was produced in a clitic language or a pronoun in a pronoun language.

5. Results

Responses were analyzed both in a quantitative and a qualitative way. Tables 4 and 5 provide the mean percentages of scores in the clitic and pronoun languages, respectively, for the native adult control data. The data in Tables 4 and 5 establish what the target situation was in each of the languages tested.

Table 4. Mean percentages of use of clitics, DPs, omission, pronouns, and other structures in clitic languages (adult data)

Language	Clitics	DPs	Omission	Pronouns	Other
Catalan	99.7	0	0	0	0.3
Croatian	90.2	2.3	6.0	0	1.5
Cypriot Greek	100.0	0	0	0	0
French	93.3	6.7	0	0	0
Greek	98.4	0	0	0	1.6
Italian	91.0	0	0	0	9.0
Polish	84.0	14.6	0	0	1.4
Portuguese	88.3	1.7	3.3	0	6.7
Romanian	96.5	0	0	0	3.5
Serbian	97.5	2.5	0	0	0
Spanish	93.3	2.1	0	0	4.6

Table 5. Mean percentages of use of pronouns, DPs, omission, and other structures in pronoun languages (adult data)

Language	Pronouns	DPs	Omission	Other
Danish	88.5	9.5	0	2.0
Dutch	89.0	10.0	0	1.0
English	95.0	5.0	0	0
German	92.7	2.1	1.0	4.2
Hebrew	98.4	0.8	0	0.8

Tables 6 and 7 provide the mean percentages of scores in the clitic and pronoun languages, respectively, for the child data. Our test prompted production of pronominals, as the relevant referent was already mentioned in the previous discourse. As discussed above, pronominals take different forms in various languages: clitics, weak or strong pronouns. In general, the most deficient pronominal form of a language is used, unless the context requires otherwise. This means that, in a language with clitics, these must be employed in situations like the one created by our task, while the use of pronouns would not be appropriate. In German, English, or Dutch, however, pronouns are expected to be employed, as these languages do not have clitics. Therefore, our first analysis aimed at establishing whether children used the target pronominal form in their language and whether they did so to the same extent in all languages investigated. This means that, in clitic languages, clitics were the target form, in languages without clitics, weak or strong pronouns were the target form, as indicated by the adult native control data in Tables 4 and 5, respectively.

To investigate the potentially different percentages of use for clitics versus pronouns, a t-test was conducted comparing all clitic versus all pronoun languages. No significant difference was observed (t(357) = 0.85, p = .30). The same percentage of pronominals was used in pronoun languages (M = 81, SD = 24) and in clitic languages (M = 84, SD = 25). Thus, it is evident that children at this age use the appropriate pronominal form at a high level.

We next compared the use of clitics among clitic languages with a one way ANOVA with languages as the independent variable and percentage of clitics as the dependent variable. This revealed a significant difference, F(10, 242) = 33.68, *p* < .001, with further analysis using a post-hoc *Scheffé* test revealed that the use of clitics is significantly lower in Portuguese than in all the other languages, and it is lower in Polish than in Catalan, Cypriot Greek, Italian, and Spanish (*p* < .001). Table 6 displays the mean percentages as well as the ranges and SDs of clitic use in the clitic languages. It also reports the mean percentages of use of DPs, omission, pronouns, and other structures.

Table 6. Mean percentages of use of clitics, DPs, omission, pronouns, and other structures in clitic languages (child data)

Language	Clitics (range; SD)	DPs	Omission	Pronouns	Other
Catalan	98.8 (92.0-100; 3)	0.4	0.0	0.0	0.8
Croatian	79.6 (33.0-100; 18)	5.0	6.4	1.0	7.7
Cypriot Greek	96.0 (83.0-100; 5)	0.7	0.6	0.0	2.7
French	90.0 (33.0-100; 19)	4.7	2.3	0.0	3.0
Greek	92.1 (67.0-100; 10)	2.5	0.4	4.2	0.8
Italian	92.9 (67.0-100; 10)	2.5	2.5	0.8	1.3
Polish	71.0 (0.0-100; 33)	3.0	18.3	3.0	4.8
Portuguese	19.3 (0.0-75; 25)	11.9	56.1	8.2	4.5
Romanian	90.8 (67.0-100; 11)	5.4	1.3	0.0	2.5
Serbian	77.7 (42.0-100; 14)	6.3	6.7	2.7	6.6
Spanish	94.2 (75.0-100; 7)	1.8	2.2	1.1	0.7

In Portuguese, children mostly used null elements, some DPs, and pronouns. An ANOVA with percentage of null elements as the dependent variable displays a significant difference among clitic languages, $F(10, 242) = 29.76$, $p < .001$; a post-hoc *Scheffé* test reveals that Portuguese is different from all the other languages ($p < .001$), and Polish is also different from Catalan, Cypriot Greek, French, and Greek ($p < .05$). A second ANOVA with percentage of DPs as the dependent variable reveals a significant effect of language, $F(10, 242) = 2.94$, $p < .01$, due to Portuguese differing from Catalan, Cypriot Greek, and Spanish in the use of DPs ($p < .05$). Then, we compared the use of clitics in adult and child Portuguese and found that adults use more clitics than children (M = 88, SD = 7 for adults and M = 19.3, SD = 25 for children), as confirmed by an ANOVA with percentage of use of clitics as the dependent variable, $F(1, 28) = 69.45$, $p < .001$. No difference was found in the use of clitics between children and adults in French (M = 90, SD = 16 for children and M = 93, SD = 10 for adults) and in Polish (M = 84, SD = 29 for adults and M = 71, SD = 33 for children).

All children produced at least one clitic, except 9/20 children in Portuguese and 2/31 children in Polish, who did not produce clitics at all. In most of the clitic languages, at least half of the children produced 100% clitics: 11/20 children in Catalan, 14/24 in Cypriot Greek, 9/25 in French, 10/20 in Greek, 11/20 in Italian, 9/20 in Romanian, 15/23 in Spanish. In Polish, Croatian, and Serbian, only 3/31, 5/25, and 3/25 children, respectively, produced 100% clitics.

Errors of gender, number, and case are very rare, but are found in all languages except Cypriot Greek. Their percentages range from 0 to 12% errors at most, calculated on the

number of clitics used. An ANOVA with percentages of errors in clitic languages as the dependent variable yields a significant effect of language, $F(10, 242) = 8.7$, $p < .001$, and post-hoc *Scheffé* test revealed that Greek has a significantly higher occurrence of errors than all other languages ($p < .05$), except Serbian. Errors in the placement of clitics were found in Croatian (1.2%), Cypriot Greek (49%),[11] and Portuguese (72%).

Table 7 displays the mean percentages of use of pronouns, DPs, omission, and other structures in pronoun languages. The use of pronouns in pronoun languages was also not uniform, with Danish and Dutch displaying the lowest use. A one-way ANOVA on the percentage of pronoun use confirmed this observation, $F(4, 101) = 8.48$, $p = .001$, with Dutch differing significantly from German ($p = .02$) and Hebrew ($p < .001$), and Danish differing from Hebrew ($p < .001$). When children did not use pronouns, they used DPs, especially in English, as shown by the ANOVA of the percentage of use of DPs, $F(4, 101) = 3.50$, $p = .01$. This variation among languages in the use of DPs is essentially due to English being significantly different from Hebrew ($p = .02$). Occasionally, children omitted pronouns altogether, especially in Dutch. In this case, the ANOVA with pronoun omission as the dependent variable yielded a significant difference, $F(4, 101) = 12.61$, $p < .001$, as Dutch differs from all the other languages ($p < .001$). In Dutch, some instances of omission of pronouns were grammatical in the adult language, as some verbs are optionally transitive (*kammen* 'comb', *verven* 'paint', and *likken* 'lick', as reported in van Hout, Veenstra, & Berends, 2011). However, the removal of these grammatical omissions, with the percentage of ungrammatical omissions dropping from 20% to 12.5%, does not affect the results, $F(4, 101) = 7.5$, $p < .001$, and Dutch is still significantly different from the other languages ($p < .01$).[12]

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[11] For further discussion of enclitic Cypriot Greek, in particular the diglossic situation in Cyprus and the differences in placement to proclitic Standard Modern Greek, see Grohmann (2011). As more comprehensive testing with younger and older children showed (Grohmann *et al.*, 2012), the non-target proclitic placement is not misplacement as such, but rather a reflex of the complex sociolinguistic situation. This is approached under the umbrella term of 'socio-syntax of development' through competing motivations between Cypriot and Standard Modern Greek with the onset of schooling by Grohmann and Leivada (2012).

[12] van Hout, Veenstra, and Berends (2011) analyzed the Dutch omission data in more detail. A subject analysis shows that there was quite some individual variation. About half of the participants did not omit objects or omitted them only once, whereas four participants omitted objects at high rates. The authors do not have any further linguistic information about these four participants.

Table 7. Mean percentages of use of pronouns, DPs, omission, and other structures in pronoun languages (child data)

Language	Pronouns (range; SD)	DPs	Omission	Other
Danish	70.0 (0.0-100; 30)	12.6	2.5	14.9
Dutch	66.2 (8.0-83.0; 25)	8.8	20.0	5.0
English	81.6 (25.0-100; 23)	18.0	0.0	0.4
German	89.0 (67.0-100; 11)	4.6	3.4	3.0
Hebrew	98.9 (92.0-100; 2)	0.4	0.0	0.7

The number of children who produced 100% pronouns was high in Hebrew (19/21 children) but lower in German (9/22), English (6/19), and Danish (5/23). All children produced pronouns, except one child in Danish, who did not produce any, and two children in Dutch, who had a very low pronoun production rate (8%).

Errors of gender, number, and case were also found, with differences among languages, mostly in German. Their percentage ranges from 0 to 19% errors at most, calculated on the number of pronoun uses. The ANOVA with percentage of errors as the dependent variable yielded a significant difference, $F(4, 101) = 23.81$, $p < .001$, due to German, which differed from all the other languages (post-hoc *Scheffé* test $p < .001$).[13] Errors in the placement of pronouns were rare and were observed only in Dutch (2.5%).

Given that there was some variation in the use of clitics among some clitic languages and in the use of pronouns among some pronoun languages, we conducted an ANOVA with verb type as independent variable and clitic/pronoun (production) as dependent variable to see whether there are differences in the production of clitics/pronouns depending on the verb used, and if there are, whether they are the same cross-linguistically. In this analysis we included only languages in which the production of clitics/pronouns was less than 90% (Croatian, Danish, Dutch, English, German, Polish, Portuguese, and Serbian). The analysis indicated no effect of verb type ($F (11, 72) = .236$, $p = .994$). By looking at the data, one may notice that the verb *paint* elicited less clitic and pronoun production in Polish and Danish, respectively, the verb *eat* elicited less clitic production in Serbian, and the verb *comb* elicited less pronoun production in Dutch. Crucially, though, none of these verbs elicited less clitic/pronoun production in the other languages, as indicated by the statistical analysis.

In summary, the target pronominal form is used frequently by children. In Portuguese

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[13] Some of the gender errors in German were also observed in the adult data and were due to the mismatch between grammatical and semantic gender in the noun *girl* (grammatical: neuter; semantic: feminine) in the test sentences with the verbs *comb* and *draw*.

clitics are used only half of the time; Portuguese-speaking children mostly use null elements. Differences are observed also among pronoun languages, with Danish and Dutch-speaking children using fewer pronouns than children speaking other languages. In Dutch, a relatively high use of null elements was observed, while in Danish a range of structures were used, mostly DPs, but their use was not significantly different. Errors of gender, number, and case were rare, and were mostly found in Polish and German. Errors in the placement of clitics were frequently observed in Cypriot Greek (but see fn. 8) and Portuguese, while the placement of pronouns was less problematic, with some rare errors found only in Dutch.

6. Discussion

The results of the production experiment across sixteen languages reveal some general common tendencies and also a few cross-linguistic differences. First, it is clear that at the age tested, children are able to produce pronominal elements. This is evident by the high rates of clitics and pronouns produced according to the target in all languages. This massive production of pronominals is revealing in three ways:

A.   It shows that there is a general cross-linguistic consistency in the results, in the sense that it is possible to say that, at age 5, children are able to produce pronominals, in all the languages tested.

B.   It shows that children have the relevant morphosyntactic knowledge involved in the production of pronominals; children know the placement and distribution of pronominals and, most of the time, opt for the target case form.

C.   It shows that children have the relevant pragmatic knowledge required to select a pronominal in the discourse setting involved in the experiment; this is shown by the fact that children do not freely vary between pronominals and DPs or forms that would be pragmatically infelicitous.

In general then, it is legitimate to say that, at age 5, pronominal elements are acquired across languages.

However, some cross-linguistic differences were found, as well. Pronominals were produced in all languages, but at different rates. The different rates make it possible to establish three language groups: languages with clitics, languages with strong/weak pronouns, and languages with null objects. Clitic and pronoun languages are those in which pronominals are produced at high and similar rates. In Portuguese, which has null objects, the rate of clitic

production is quite low, and null complements are the preferred option. Two main observations can be drawn from these cross-linguistic differences:

A. No difference was found between clitics and pronouns in production. This contrasts with the literature on pronominal comprehension in which a difference has been established between clitics and pronouns (see the Delay of Principle B Effect or the Pronoun Interpretation Problem; e.g., McKee, 1992; Baauw, Coopmans, & Philip, 1999; Baauw *et al.*, 2011; Varlokosta, 2000, among others) (nevertheless, see the discussions in Baauw *et al.*, 2011 and Conroy *et al.*, 2009 for the possibility that experimental design and choice of experimental materials and tasks may have affected the results observed in the comprehension studies of pronominals).

B. The fact that null objects are preferred in Portuguese confirms that, in this language, children overuse the weakest form of the nominal hierarchy (i.e. null objects), producing them even in a context in which the target grammar rules them out (Costa, Lobo, & Silva, 2009). However, it is worth emphasizing that there does not seem to be a problem with pronominals in this language — they are produced correctly at a moderate rate. The only problem is the preference for an alternative strategy which is available in the language — the null object option.[14]

The comparison between the three language groups, including the observation that, in Portuguese, children prefer the null-complement option, reveals a striking cross-linguistic pattern in spite of the differences: across languages, children consistently opt for the weakest form available to them in the language they are acquiring. This is particularly clear in a language like Italian, that has strong, weak, and clitic pronouns, and yet children go for the weakest clitic form, or in a language like Portuguese, which has strong and clitic pronouns and null objects, and children opt for the latter. This cross-linguistic preference for the weakest form is interesting, since it again reveals that children know the relevant pragmatics associated with the discourse context, and that behavior is very consistent across languages. The option for the weakest form is a sign of good pragmatic knowledge, because it indicates that children know that given referents are best mapped onto non-salient expressions (Ariel, 1990; Gundel *et al.*, 1993). The cross-linguistically consistent behavior reveals not only that

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[14] Children acquiring Portuguese are not adult-like. According to Costa and Lobo (2011), this may be due to the fact that a late acquisition of the properties distinguishing pro and variables delays a steady knowledge of the context in which null objects are ruled out. If the null object is not interpreted like a variable, it can be used in contexts in which pronominals are accepted, such as islands.

the differences found are superficial, but also that children exhibit good knowledge of the pronominal paradigms in their languages and of the set of alternatives that could be used in the context of a pronominal. Note that, in order to select the weakest form (including the null object in Portuguese), one must accept that this form competes with the stronger alternatives. Moreover, note that our claim that children opt for the weakest form available in the language they are acquiring entails that we expect cross-linguistic variation in the forms used by children across languages, as indicated by the results of the experiment we report here.

Related to the point just made that children know the paradigms in their languages, it is interesting to comment on their knowledge about null alternatives. Tuller (2000) and Cummins and Roberge (2005) show that French has null complements. Null objects in French, however, appear to be different from those available in Portuguese. In French, null objects are lexically constrained and not licensed in the pragmatic context of the present test. Interestingly, French children did not opt for a null complement in the context of this experiment. This indicates that children know the pragmatics associated with the empty categories available to them, as well as the lexically determined limitations of their distribution, whenever this is relevant, as in French. They may fail to master the syntactic distribution of the null complement, as evidenced by the overuse of null objects in strong islands by Portuguese-speaking children, but they do not randomly replace obligatory pronominals by any available null expression in the language. Again, this leads to the conclusion that their pragmatic knowledge is highly accurate at age 5.

Topic-drop is another construction that may license a null complement. In topic-drop, the empty complement must be in sentence-initial position, which does not happen in the context of elicitation of the present experiment, since we used embedded adverbial subordinate clauses. The fact that, in Dutch, there were some instances of null complements may signal that Dutch children occasionally overuse the topic-drop construction, in the same way Portuguese-speaking children overuse the null object construction.

In short, the comparison between the three types of null-complement possibilities (lexically restricted, as in French; null object, as in Portuguese; topic-drop, as in Dutch) suggests that children know the specific properties of the null complements available in their languages, but may still overuse them in inadequate syntactic contexts, although not in inadequate pragmatic contexts, which explains the good performance of the French children.

Summarizing, in this discussion we provided arguments that: (i) five-year-old children's knowledge of pronominals is target-consistent across languages; (ii) children consistently opt for the weakest alternative, in accordance to the scale *pronoun > clitic > null*, depending on

what is available in their languages;[15] (iii) children reveal a very accurate knowledge of the alternative options for the discourse setting of the experiment; (iv) the preference for the weakest form in languages with a null complement may disguise the fact that children are quite competent in producing pronominals; (v) children's knowledge of null-complement typologies is good, although they sometimes misuse them extending null complements to inappropriate syntactic environments.

We have been able to reach these conclusions through use of a common methodology in sixteen languages. Our method involved use of a single task that did not produce any noise. The task was short, eliciting a specific construction and not a variety of structures, thus freeing the child from possible task-related processing difficulties, and at the same time allowing us to tap into their knowledge more directly.

The overall results and the clarifications made regarding the nature of null complements — in particular the clarification that the production of null complements does not mean that children do not know pronominals — allow us to draw a firm conclusion: Pronominal production can be taken as a cross-linguistic robust marker of language development. We see that 5-year-old children produce third-person pronominal objects, and that the shape and placement of pronominal forms is target-like. The ability to produce pronominals may be hidden by massive production of null complements, in languages allowing for it. However, it is legitimate to conclude from our data that a child who at age 5 is not able to produce any or few pronominal forms is a child at risk for language impairment. In this way, pronominal production can be taken as a developmental marker, provided that one takes into account whether the language allows for null objects.

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[15] One anonymous reviewer raised the issue that the finding (ii) could be an artifact of the restriction of our experiment to third-person pronominals and another result may arise if first and second-person pronouns/clitics, including reflexives, were tested with a different design. An indication that this findings is not an artifact of the restriction to third-person pronominals is that Costa et al. (2008) elicited dative and reflexive clitics in first and second-person in European Portuguese, where the null option is not allowed, with a similar design to the design used in this study. It is hard to say whether our findings for third-person pronominals and the findings in Costa et al. (2008) for first and second-person dative and reflexive clitics are the automatic outcome of the design used, namely elicitation tasks with pictures, as we are not aware of other designs used to elicit pronouns/clitics.

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Appendix A

Examples of sentences used to accompany the picture in Figure 1, for all the languages tested.

(1) a. *pre-verbal clitic*

Catalan
El nen ruixa el gat i el gat està moll.
the boy sprays the cat and the cat is wet
Com és que el gat està moll?
how is that the cat is wet
El gat està moll perquè el nen **el** ruixa.
the cat is wet because the boy CL.ACC.3SG wet.PRES.3SG

French
Le garçon arrose le chat et le chat est mouillé.
the boy sprays the cat and the cat is wet
Pourquoi est-ce-que le chat est si mouillé?
why is-it-that the cat is so wet
Le chat est mouillé parce que le garçon **l'**arrose.
the cat is wet because the boy CL.ACC.3SG spray.PRES.3SG

Italian
Il bambino sta bagnando il gatto ed il gatto è bagnato.
the boy is wetting the cat and now the cat is wet
Perché il gatto è così bagnato?
why the cat is so wet
Il gatto è bagnato perche il bambino **lo** bagna/ sta bagnando.
the cat is wet because the boy CL.ACC.3SG.MASC wet.PRES.3SG/ is wetting

Romanian
Băiatul stropeşte/udă pisica şi pisica e udă.
boy.the sprays cat.the and cat.the is wet
De ce e pisica aşa udă?
why is cat.the that wet
Pisica e udă pentru că **o** stropeşte/udă băiatul.
cat.the is wet because CL.ACC.3SG.FEM spray.PRES.3SG boy.the

Spanish
El niño está mojando a-l gato y ahora el gato está mojado.

the boy is weting to-the cat and now the cat is wet.MASC

¿Por qué está mojado el gato?

why is wet.MASC the cat

El gato está mojado porque el niño **lo** ha mojado.

The cat is wet.MASC because the child CL.ACC.3SG.MASC has wetted

Standard Modern Greek

To aɣori vrexi ti ɣata ke i ɣata ine vreɣmeni.

the boy wets the cat and the cat is wet

Jati ine vreɣmeni i ɣata?

why is wet the cat

I ɣata ine vreɣmeni jati to aɣori **tin** vrexi.

the cat is wet because the boy CL.ACC.3SG.FEM wet.PRES.3SG

b.   *post-verbal clitic*

Cypriot Greek

Toaɣori vreʃi ti ɣata tʃe i ɣata e vremeni.

the boy wets the cat and the cat is wet

Jati i ɣata e vremeni?

why the cat is wet

I ɣata e vremeni jati to aɣori vreʃi **tin**.

the cat is wet because the boy wet.PRES.3SG CL.ACC.3SG.FEM

European Portuguese

O menino molhou o gato e o gato está molhado.

the boy wet.PAST. the cat and the cat is wet.

Porque é que o gato está molhado?

why is that the cat is wet

O gato está molhado porque o menino **o** molhou.

the cat is wet because the boy CL.ACC.3SG.MASC wet.PAST.3SG

c.   *second-position clitic*

Croatian

Dječak prska mačku i mačka je mokra.

boy sprays cat and cat is wet

Zašto je mačka mokra?

why is cat wet

Mačka je mokra zato što **ju** je dječak poprskao.

cat is wet because CL.ACC.3SG.FEM be.AUX boy spray.PERF.3SG

Polish

Chłopiec ochlapuje kota i kot jest mokry.

boy sprays cat and cat is wet

Dlaczego kot jest mokry?

why cat is wet

Kot jest mokry bo chłopiec ochlapuje **go**.

cat is wet because boy spray.PRES.3SG CL.ACC.3SG.MASC

Serbian

Dečak poliva mačku i mačka je mokra.

boy wets cat and cat is wet

Zašto je mačka mokra?

why is cat wet

Mačka je mokra zato što **je** dečak poliva.

cat is wet because CL.ACC.3SG.FEM boy wet.PRES.3SG

(2)   *pronoun*

Danish

Dreng-en sprøjter på katt-en og katt-en er våd.

boy-the spray on cat-the and cat-the is wet

Hvorfor er katt-en våd?

why is cat-the wet?

Katt-en er våd fordi dreng-en sprøjter på **den**.

cat-the is wet because boy-the spray.PRES on PRON.COMMON.3SG

Dutch

De jongen spuit de poes nat en nu is de poes nat.

the boy sprays the cat wet and now is the cat wet

Hoe komt het dat de poes nat is?

how comes it that the cat wet is

De poes is nat omdat de jongen **'m** nat heeft gespoten.

the cat is wet because the boy PRON.ACC.3SG.MASC wet has sprayed

German

Der Junge spritzt die Katze nass und die Katze ist sehr nass.

the boy sprays the cat wet and the cat is very wet

Wieso ist die Katze so nass?

why is the cat so wet

Die Katze ist so nass, weil der Junge **die/sie** nass spritzt.

the cat is so wet because the boy PRON.ACC.3SG.FEM wet sprays

Hebrew

ha-yeled hirtiv et ha-xatul ve-axshav ha-xatul ratuv.

the-boy wet ACC the-cat and-now the-cat wet

Lama ha-xatul ratuv?

why the-cat wet?

Ha-xatul ratuv biglal she-ha-yeled hirtiv **oto**.

the-cat wet because that-the-boy wet.PAST.3SG.MASC PRON.ACC.3SG.MASC

Appendix B

Verbs, pictures, and lead-in sentences for the English experiment.

Verb	Picture description	Experimenter
cover	princess covering soldier	The princess covered the soldier. Now the soldier is warm. Why is the soldier warm? The soldier is warm because the princess…
comb	mother combing girl's hair	Mommy is combing the girl and the girl is beautiful. Why is the girl beautiful? The girl is beautiful because mommy…
dry	boy drying hippo	The boy is drying the hippo. The hippo will be dry soon. Why is the hippo getting dry? The hippo is dry because the boy…
wake up	girl waking up boy	The girl woke up the sleeping boy. Now the boy is crying. Why is the boy crying? The boy is crying because the girl…
draw	drawer/man drawing girl	The drawer/man is drawing the girl and the girl is happy. Why is the girl happy? The girl is happy because the drawer/man…
wet	boy spraying cat with water	The boy is spraying the cat and the cat is wet. Why is the cat so wet? The cat is wet because the boy…
paint	painter/man painting house	The painter/man painted the house, and it became blue. Why is the house blue? The house is blue because the painter/man…
lick	dog licking cat	The dog is licking the cat, and now the cat is happy. Why is the cat so happy? The cat is happy because the dog…
tie	bee tying up grasshopper	The bee tied up the grasshopper, and the grasshopper cannot jump. Why can't the grasshopper jump? The grasshopper can't jump because the bee…
wash	girl washing giraffe	The girl is washing the giraffe, and the giraffe is clean. Why is the giraffe clean? The giraffe is clean because the girl…
eat	boy eating a piece of the cake	The boy ate a piece of the cake, and that piece of the cake disappeared! Why did the piece of the cake disappear? The piece of cake disappeared because the boy…
catch	girl catching butterfly	The girl caught the butterfly and the butterfly cannot fly. Why can't the butterfly fly? The butterfly can't fly because the girl...

Appendix C

The verbs that were used in the 16 languages (in their infinitival form; in Cypriot Greek and Standard Modern Greek, that do not have infinitives, the verb is provided in the third-person singular present form).

English	Catalan	Croatian	Cypriot Greek	Danish	Dutch	French	German	Greek	Hebrew	Italian	Polish	Portuguese	Romanian	Serbian	Spanish
cover	tapar	pokriti	ʃepazi	putte	toedekken	couvrir	zudecken	skepazi	lexasot	coprire	przykryć	tapar	acoperi	pokriti	tapar
comb	pentinar	češljati	xtenizi	frisere	kammen	coiffer	kämmen	xtenizi	lesarek	pettinare	czesać	pentear	pieptăna	češljati	peinar
dry	eixugar	sušiti	skupizi 'wipe'	tørre	afdrogen	sécher	abtrocknen	stegnoni	lenagev	asciugare	wycierać	secar	şterge 'wipe'	brisati	secar
wake up	despertar	buditi	ksipna	vække	wakkermaken	réveiller	aufwecken	ksipna	Leha'ir	svegliare	obudzić	acordar	trezi	probuditi	despertar
draw	dibuixar	slikati	zoɣrafizi	tegne	schilderen	dessiner	malen	zoɣrafizi	lecayer	dipingere	malować	desenhar	picta	crtati	dibujar
wet	mullar	močiti	vreʃi	våd	natspuiten	arroser 'water'	nassspritzen	vrexi	lehartiv	bagnare	moczyć	molhar	uda	polivati	mojar
paint	pintar	ličiti	poʝatizi	male	verven	peindre	anstreichen	vafi	licbo'aa	dipingere	pomalować	pintar	vopsi	farbati	pintar
lick	llepar	lizati	ɣlifi	slikke	likken	lécher	ablecken	ɣlifi	lelakek	leccare	lizać	lamber	linge	lizati	chupar
tie	lligar	vezati	ðini	binde	vastbinden	attacher	fesseln	ðeni	likshor	legare	związać	atar	lega	vezati	atar
wash	rentar	prati	luni	vaske	wassen	laver	waschen	pleni	lirxoc	lavare	myć	lavar	spăla	prati	lavar
eat	menjar	jesti	troi	spise	eten	manger	essen	troi	leexol	mangiare	zjeść	comer	mînca	pojesti	comer
catch	caçar	uhvatati	pcani	fange	vangen	attraper	fangen	piani	litpos	prendere	złapać	apanhar	prinde	uhvatiti	atrapar

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