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Abstract

A basic question that arises with respect to early bilingual comprehension is whether, as in production, bilingual infants understand words from two languages that have the same meaning (translation equivalents). This study addresses this question using CDI-data from 31 children growing up bilingual in French and Dutch. Raters report that 13-month-old bilingual infants all understand translation equivalents; however, the extent to which children understand translation equivalents is marked by considerable inter-individual variability. This understanding is related to how many meanings children understand: the more advanced infants' comprehension skills are, the more meanings they know in two languages rather than just one.

Key words

bilingual infants

comprehension

MacArthur Communicative Development Inventory

1 Introduction

There is now quite a large body of research relating to the comprehension of language in adult bilinguals (see several chapters in Kroll & de Groot, 2005). In infant bilingualism research, however, language comprehension has so far not been studied (but, see, e.g., Umbel, Pearson, Fernández & Oller, 1992, for a study of receptive skills in older bilingual children, i.e., first graders) (see footnote 1 overleaf). Except in studies of preverbal speech perception (e.g., Bosch & Sebastián-Gallès, 2001), the focus of developmental

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bilingual research usually falls on production. Yet an understanding of the process through which bilingual children learn to comprehend their two languages is necessary for a deeper understanding of bilingual language acquisition as a whole. Even if there are dissociations between comprehension and production (e.g., Bates, Dale, & Thal, 1995), much of production would not be possible without prior comprehension. It is well established that before monolingual children begin to speak, they already understand words (e.g., Bates et al., 1995; Clark, 2002, p. 85), and at least two diary studies support this observation in bilingual children (Deuchar & Quay, 2000, p. 5; Leopold, 1970). In addition, given sufficient time and learning opportunities, children growing up with two languages from a very young age learn to comprehend those languages: There are no reports of children growing up with two languages who only learn to comprehend one language. Less certain is whether bilingual children actually learn to speak both of the languages they comprehend: Unpublished data from a survey of approximately 2,500 bilingual families carried out by the first author suggest that about one in five children growing up bilingually fails to speak one of the languages heard from birth (for information on the survey, see De Houwer, 2003). Comprehension, then, is a central feature of the bilingual acquisition process, and deserves more research attention than it has received so far. To date, there have been no systematic studies of early word comprehension in bilingual children as we present here.

There are several possible reasons why there are no studies of language comprehension in young bilinguals. One is the obvious fact that in the adult and developmental psycholinguistic literature as a whole, studies of language and speech production are much more common than are studies of comprehension (see, e.g., Levelt's (1989) major work on psycholinguistic processing). Quite simply, there appears to be much more research interest in explaining people's expressive language behavior than in their less obvious receptive language skills. Given this general lesser interest, it is relevant that the bulk of research into bilingual acquisition has been carried out only in the last 20 years or so, and the first priority in this work has been to explain the development of morphosyntax in children's bilingual production (see De Houwer, 2005). There has just not been a sufficiently "critical mass" in terms of research on the study of comprehension as well.

Another reason is that until recently the methods with which comprehension in young children could be studied were quite cumbersome and difficult. However, the adaptation of the Infant Form of the American English MacArthur Communicative Development Inventory (CDI; Fenson, Dale, Reznick, Thal, Bates, Hartung, Pethick, & Reilly, 1993) into other languages now makes it possible to study aspects of early lexical comprehension in different languages, including two languages being acquired simultaneously. Without the CDI or similar instrument, such study would be extremely difficult.

The Infant CDI is an adult report instrument appropriate to children between the ages of 8 and 16 months that asks caregivers to check off which words on a list of several hundred items arranged in about two dozen categories they believe their child

[1] Pearson, Fernández and Oller (1993) present comparisons between word comprehension by a group of Spanish-English bilingual and English monolingual infants. However, various methodological issues such as unclarity about the ages for which data are reported, the rationale behind collapsing data across ages, and the presentation of data only with reference to percentile norming scores developed for a monolingual English population make the findings difficult to interpret.

understands, or understands and says. Using adaptations of the CDI in each of two languages a child is exposed to in a bilingual setting, it becomes possible to investigate the size and nature of most of the child's comprehension vocabulary in each of his or her two languages, and it becomes possible to compare the two. The MacArthur CDI has already been successfully used in bilingual acquisition studies to investigate different aspects of bilingual children's early production vocabularies, either as a primary or sole source of data (e.g., David & Li Wei, 2003; Marchman & Martínez-Sussmann, 2002; Pearson, Fernández, & Oller, 1995, respectively), or as a secondary source (Holowka, Brosseau-Lapré, & Petitto, 2002).

In bilingual acquisition (as in much of bilingualism research), the main focus has been on the relation between a bilingual child's two developing languages (De Houwer, 2005). The study by Pearson et al. (1995) also focuses on the relation between children's two languages, in this case Spanish and English, in terms of their production of "translation equivalents." Translation equivalents (henceforth: TE's) are words from both input languages that have the same adult meaning. The 27 children who served as participants were between 8 and 30 months of age. The study by Holowka et al. (2002) also discusses the issue of the relationship between a child's two languages (amongst others), based on longitudinal data from six English-French bilingual infants between the ages of 7 and 26 months. Both Pearson et al. (1995) and Holowka et al. (2002) find that all children (except one) used words from each of their two languages to refer to the same general meaning (e.g., English *bear* and Spanish *oso*— Pearson et al., 1995). Two additional studies also focusing on expressive vocabulary, and using instruments similar to the CDI, confirm that young bilingual children produce cross-language synonyms that have the same referent: Junker and Stockman (2002) show this to be the case for 24-month-old German-English toddlers, and Águila, Ramon, Pons and Bosch (2004) find this result for infants between the ages of 12 and 14 months reared with Spanish and Catalan. Observational studies of the early word production of bilingual infants show that such cross-language synonyms are used from the beginning of word production onwards (for English-Spanish, see Quay, 1995; for English-German, see Schelleter, 2002).

Clearly, and in spite of earlier claims to the contrary (Taeschner, 1983, Volterra & Taeschner, 1978), young bilingual infants produce words that are cross-linguistic synonyms from an adult point of view. Children may appear to use these words as real synonyms (e.g., see many examples in Quay, 1995), or they may use these synonyms with different but similar meanings (e.g., English *car* to refer to most cars, and Dutch *auto* (=car) to refer exclusively to a favorite aunt's car—example courtesy of Seline Benjamins, personal communication).

Given the fluidity of children's early meanings in production, however, it is often very difficult to know exactly what a child's intended meaning is. Underextensions are especially difficult to assess (see, e.g., Clark, 2002). There is also the more theoretical issue of the representational status of early words as used by young bilingual children, which remains unresolved (cf. Bernhardt & Stemberger, 1998; De Houwer, 1995; Deuchar & Quay, 2000, pp. 63–64; Johnson & Lancaster, 1998). Finally, the paucity of the available data on early semantic and lexical development in bilingual children makes it very difficult to assess what the findings for cross-linguistic synonyms really mean for the relation between a bilingual child's two languages. The empirical fact remains,

though, that as soon as they start to speak, young bilingual children use "translation equivalents."

Given that young bilingual children are able to produce translation equivalents from an early age, the question arises to what extent they are able to comprehend such translation equivalents. Input to bilingual children includes words that are unique to one or the other language, as well as words with separate forms in each language, but the same meaning. Thus, translation equivalents will be part and parcel of the input that young bilingual children are exposed to from an early age. Such cross-linguistic synonymy might, however, pose a problem for bilingual children if they operate according to the Principle of Contrast (Clark, 1993, p. 92), which claims that young children reject apparent synonyms. If bilingual children were to rely on this principle to guide their lexical learning, we would expect them to "block" learning a word in language A for a referent Y that they already understand a word for in language B. Such a learning principle, however, appears counterintuitive for bilingual children. Rather, we propose that early on, children growing up bilingually comprehend translation equivalents.

The present study is geared towards exploring this proposal. We obtained word comprehension data about 31 bilingual infants in both their languages, French and Dutch, from adults in the child's life, and we investigated the extent to which young bilingual children understand French and Dutch translation equivalents referring to what is basically the same referent. Our focus is on Bilingual First Language Acquisition (BFLA; Meisel, 1989; De Houwer, 1990), that is, we study language comprehension in children receiving input in two languages from birth. We collected CDI reports of infant language comprehension at 13 months, the youngest age for which we would expect reliable parental reports, and we collected reports from up to three people per language per infant.

2 Method

2.1 *Participants*

The data presented in this study were collected as part of a study of early communicative development in firstborn children growing up in Belgium. We have collected longitudinal data for 30 monolingual Dutch speaking families and 31 Dutch-French speaking families at the preset child ages of 5, 13, and 20 months. All families are middle- to upper middle-class. For this study we consider data from all the bilingual Dutch-French speaking families collected at child age 13 months.

Families were recruited before their child was five months old. For the bilingual sample, the criteria for inclusion in the study were: Families had to consist of a pair of different sex parents living together with their first and only biological child; mothers had to have completed high school; the child had to be less than four months old at the time of recruitment; families had to commit to participating until the final age of data collection (20 months); the child had to be reared with Dutch and French at home from birth. There were no preset conditions for language presentation. Consequently, there is variation in the sample, with some mothers addressing their child solely in Dutch, and others addressing their child solely in French, and with the fathers speaking the

other language. Most of the 31 children were reared according to the "one parent, one language" principle, which here means that within the family, each parent addressed the child in mainly one language only. Also, background information on other people the children were in contact with shows that most interacted with the children using one language only. Most children were growing up in Flanders, where the language of public life and child care services is Dutch.

At the time of data collection, the bilingual families consisted of at least a mother, father, and one child. Mothers' ages ranged between 23 and 38 and fathers' between 26 and 47 years. All 31 mothers had completed high school, and 52% had a higher education degree. Fathers' levels of education were similar with all but two fathers having completed high school and 58% having completed a higher education degree. The group of children in the 31 families consisted of 14 girls and 17 boys, and they averaged 13.16 months ($SD = .36$).

In some cases (see below), participants also included other adults who knew the child very well ("third persons"). These third persons were all females and were either the child's grandmother, aunt, nanny, family childcare provider, or a childcare provider at a larger day-care center. Their ages ranged from 21 to 65, and their educational levels varied, with highest diplomas ranging from junior level high school to four-year college.

2.2 *Instruments*

Dutch MacArthur Communicative Development Inventory

This inventory is the Infant Form "Words and Gestures" of the Dutch adaptation (N-CDI; Zink & Lejaegere, 2002) of the MacArthur Communicative Development Inventory (MCDI; Fenson et al., 1993). The Dutch N-CDI: Woorden en Gebaren contains a total of 536 items. The bulk (434 or 80.97%) consists of vocabulary items (mostly words and occasionally brief phrases). Raters check whether a child understands an item, or understands and says it. If items are left unchecked, they are not known by the child. The N-CDI unfortunately contains many vocabulary list items that consist of more than one word or phrase (for instance: *slabbetje/bavet*, both meaning 'bib', but *slabbetje* is more standard, and *bavet* more regional), which makes it impossible to know which form the child actually understands (or produces). The N-CDI has been fully normed (Zink & Lejaegere, 2002).

French MacArthur Communicative Development Inventory

This inventory is the Infant Form "Words and Gestures" of the European French adaptation (F-CDI; Kern, 1999) of the MacArthur Communicative Development Inventory (MCDI; Fenson et al., 1993). The French F-CDI: "Mots et Gestes" contains a total of 514 items. The bulk (414 or 80.54%) consists of vocabulary items (mostly words and occasionally brief phrases). Raters check whether a child understands an item, or understands and says it. If items are left unchecked, they are not known by the child. Vocabulary list items consisting of more than one word or phrase are rare in the F-CDI. Norming is well under way (see, e.g., Bovet, Danjou, Langue, Moretto, Tockert, & Kern, 2005).

In the study reported on here, we used the N-CDI and F-CDI solely as research tools, without reference to norms. It should be noted here that comprehension as measured

by the CDI simply refers to parents checking off an item on the list as "understood." Parents received no further instructions in terms of comprehension. There is some kind of "context" provided by the list, however, because it is divided into 19 sections that are primarily semantically based (e.g., a section 'People'). There are also "grammatical" sections (e.g., 'Verbs').

2.3 *Procedure*

The mothers in the study were asked to complete both the French and the Dutch CDI-adaptations themselves, and they were requested to arrange for both the child's father and the third person to fill out both forms as well. The choice of this third person was left to the mother's discretion, the major stipulation being that the person in question was "very familiar" with the child. Typically, mothers asked their daily childcare provider to fill out the forms (whether she was a relative, such as a grandmother, or not — see above). Everyone who agreed to cooperate reported that they completed the forms without consulting any other person. All reporter categories (mothers, fathers, and third persons) were asked to complete the CDIs when the target child was around 13 months of age.

We decided to involve more than one person in assessing the child's communicative ability because this would give us a more complete picture of the child's capabilities (De Houwer, Bornstein, & Leach, 2005). Our decision to ask all possible reporters to fill out CDI forms for each of the languages was based on the presumption that in many cases reporters' contacts with the child in question were not limited to only one language, even though any one reporter might address the child in one language only. Ideally, then, all adults (mothers, fathers and third persons) were to complete both the French and the Dutch CDI-adaptations. Only for five families, however, did we receive 2 (language) × 3 (person) completed CDI-forms. One reason is that in some families there was no person outside the parent pair who knew the child well enough to fill out any forms for any language. For families where there was such a person available, many third persons completed the form for only one language and sent back the other without filling it in. The major reason given was that they did not understand the other language (in most cases it was the French form that was not filled in). As a result of the lack of knowledge (and input to the child) of either Dutch or French, we had an additional eight families where both parents filled out both forms, but the third person filled out only one form. A few parents refused to fill out one of the forms, because they saw themselves very much as being the input provider for just one language, and did not see how they could judge anything with regard to the other language. This circumstance sometimes resulted in our having only one completed form for one of the languages, which most likely leads to an underevaluation of the child's knowledge of that particular language. Most parents, however, filled out the forms for both languages, thus showing that in a bilingual family, bilingual parents have access to their child's early knowledge of both languages.

For each child, we combined the two or three completed forms for Dutch, and computed a "cumulative score" for each item on the form (De Houwer et al., 2005). This cumulative score counts the "best" score for an item on the CDI that any one rater gives.

Most relevant to the study here is that a word was counted as comprehended if at least one of the raters, but not necessarily all, indicated that the child understood an item. (When only one form was completed, the "cumulative score" was identical to the single rater's score). We did the same for the French forms. The data presented here represent the child's knowledge according to at least one of the reporters, if not all.

3 Analyses and results

3.1 *Scope*

The analyses here are restricted to the vocabulary sections of the N-CDI and F-CDI, namely, to 434 and 414 lexical items, respectively. We also limit our analyses to word comprehension, including the comprehension of those words that are also produced by the child.

Our focus is on the extent to which young children understand "translation equivalents." We define translation equivalents as word pairs consisting of formally distinct word forms from different languages that in a particular context can be considered equivalent in meaning, although they might have different connotations (see also Junker & Stockman, 2002). An example would be French *pomme* and Dutch *appel* (apple). Another example would be French *sauter* and Dutch *springen* (jump). For each of these pairs, it is easy to think of situations where the words in each language would be interchangeable without a change in meaning. When in the following we speak of children's possible knowledge of translation equivalents, we do not imply that children would "know" that Dutch *appel* is a possible translation of French *pomme*. Rather, we are interested in whether children understand both French *pomme* and Dutch *appel*, rather than either just French *pomme* or just Dutch *appel*. The notion that translation equivalents must be formally distinct ensures that highly similar word forms or even identical ones as used in two languages (with the same meaning) are not inappropriately given a particular language status. For example, Dutch *banaan* as enunciated in informal settings by Belgian speakers of Dutch, and French *banane* (banana) are virtually indistinguishable. Forms like *banaan*/*banane* are in fact language neutral (see further below). (See Schelleter, 2002, for a discussion of the role of form similarity in bilingual development.)

A comparison of the lexical items on the N-CDI and those on the F-CDI should find many translation equivalents. After all, both the N-DCI and the F-CDI have the same word list, namely, the American English MCDI, as their starting point. However, the American English MCDI has not simply been translated into other languages, including Dutch and French, but is being adapted to these other languages. This is because, among other things, some items in the Inventory are culture specific. In addition, where English uses only one word (e.g., *bottle*), other languages may use two (e.g., French *biberon* and *bouteille*). Or where English uses two words, other languages may need only one (e.g., English *borrow* and *lend* both translate into Dutch as *lenen*). Polysemy, then, is a major obstacle to a "straight" translation of the English MCDI. The division of the CDI into lexical domains helps to reduce this polysemy. Also, adaptations may add lexical items that are relevant to a particular language or culture without them having any link with

an item on the MCDI (e.g., the item *ziekenwagen / ambulance / ziekenauto* (ambulance) under "Vehicles (Real or Toy)" is present in the Dutch version and not in the American English one). In addition, some items are dropped because they are culturally void in the "new" language (e.g., the item *cheerios* from the American English version does not feature in any translation on the Dutch or French versions, since the actual object does not exist in Belgium or France — except perhaps in American food stores there!).

Given the changes that necessarily take place in any one adaptation from the American English MCDI, and the ones that are introduced by choice, one should expect differences between adaptations. We compared the N-CDI and the F-CDI to each other in order to determine (within each lexical domain, e.g., "Parts of the body") which lexical items are translation equivalents and which are not. For the kinds of meanings that are represented in the Dutch and French versions of the Infant Form of the MCDI, it is usually straightforward to determine which words form translation equivalents.

We found some fairly large differences between the N-CDI and the F-CDI: About one-fifth (20.50%) of the vocabulary items on the N-CDI do not have a corresponding item on the F-CDI. Close to one-tenth (12.30%) of the lexical items on the F-CDI do not have an equivalent on the N-CDI. The difference exists largely because the N-CDI contains about twice as many items as the F-CDI that are list specific (89 vs. 47), namely, that are particular to one language only, such as Dutch *fruitpap* (= home-made mushy baby food with fruits and yoghurt or soft cheese) and French *endormi* (= fallen asleep).

If we want to investigate the extent to which infants understand both members of a translation equivalent pair, we should ignore list specific items, because they tell us nothing about children's comprehension of a pair of words that happen to be translation equivalents. After all, for list specific items the list in the other language did not offer reporters the opportunity to check off the translation equivalent. In the case of list specific items, then, we cannot tell whether the child understands the translation equivalent or not. Another minor class of items that is not amenable to investigation is the small group of 14 items that is exactly the same in the N-CDI and the F-CDI both as far as meaning and form is concerned (these are the previously mentioned "language neutral" words). An example is the item *bus*, which is pronounced the same way in French and Dutch as spoken in Belgium, and which means exactly the same thing within the lexical category of "Vehicles."

If we take into account these several points, there are 331 items in the N-CDI that remain for analysis, and 353 items in the F-CDI. Table 1 summarizes the steps taken to obtain these figures.

3.2 *Translation equivalents across the N-CDI and F-CDI (Infant Forms)*

The 331 Dutch and the 353 French items on the N-CDI and F-CDI that have a translation equivalent on the other-language form together make up 361 pairs of actual translation equivalents. This is the result of many words being polysemous within one particular lexical category on the CDI. A word that is polysemous in one language will be equivalent to two words in the other, so the child who knows three words in French and three words in Dutch can know four pairs instead of three, as shown in Table 2.

Table 1

Comparative overview of the Dutch and French CDI (N-CDI and F-CDI, respectively

N-CDI	Number of	F-CDI
434 (100%)	Total of lexical items on vocabulary checklist	414 (100%)
89 (20.50%)	Items specific to one list only	47 (11.30%)
14 (3.20%)	Items identical in meaning and form across both lists	14 (3.40%)
331 (76.30%)	Items that have at least one translation equivalent in the list in the other language	353 (85.30%)

Items that remain for cross-language analysis

Table 2

Examples of mismatches between the number of words on the N-CDI and F-CDI and the number of translation equivalent pairs because of polysemy

Word forms Dutch CDI N=3	**Translation equivalent pairs** N=4	**Word forms French CDI** N=3
fles (bottle + feeding bottle)	**bouteille – fles** (bottle) **biberon – fles** (feeding bottle)	**bouteille** (bottle) **biberon** (feeding bottle)
druif (grape) **rozijn** (raisin)	**raisin – druif** (grape) **raisin – rozijn** (raisin)	**raisin** (grape + raisin)

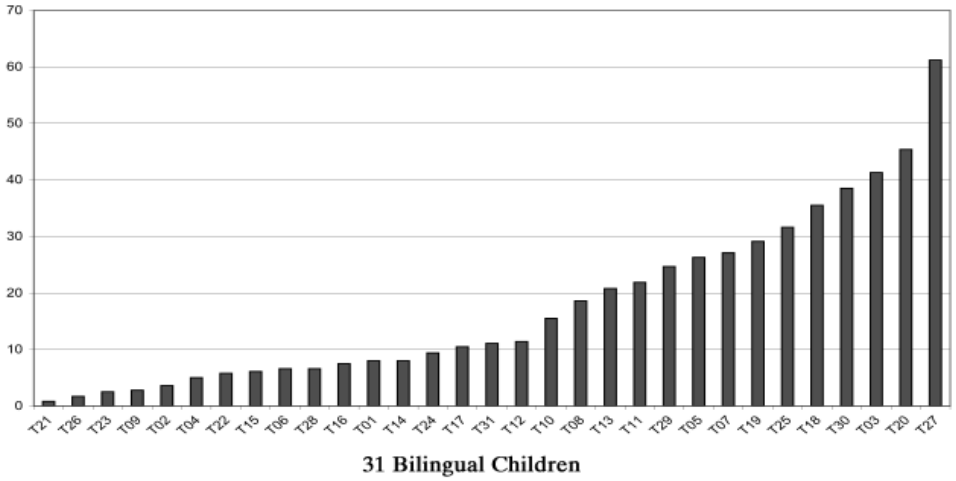
In the following analyses we investigate the extent to which the children in the sample understand both the French and the Dutch words making up the 361 translation equivalent pairs. We call the French and the Dutch words making up a translation equivalent pair the *members* of that pair. When children understand both members of a translation equivalent pair, we say they understand a *doublet*. When they understand just the Dutch, or just the French word, we say they understand a *singlet*. Following Pearson et al. (1995), we consider any one translation equivalent pair as the expression of one core meaning. Although the underlying theoretical issues are complex, for the sorts of meanings that young children meet up with and that are present in the CDI, and having taken into account polysemy, equating a translation equivalent pair with the expression of a single core meaning is straightforward.

3.3
Bilingual infants' comprehension of singlets versus doublets

First we examine to what extent 13 month old bilingual children understand both language forms (or doublets) of the 361 pairs of translation equivalents (TE's). All the children in our sample understood doublets (as measured by the CDI), but there was a very large variation in the number of doublets they understood (Fig. 1). On average, children in the sample understood doublets for 17.60% of the 361 possible translation equivalent pairs, with a range between 61.20% (221/361) and 0.80% (3/361) ($SD = 15.20\%$).

Figure 1

The proportion of translation equivalent pairs (N = 361) understood by 31 bilingual French-Dutch children at age 13 months (doublets)

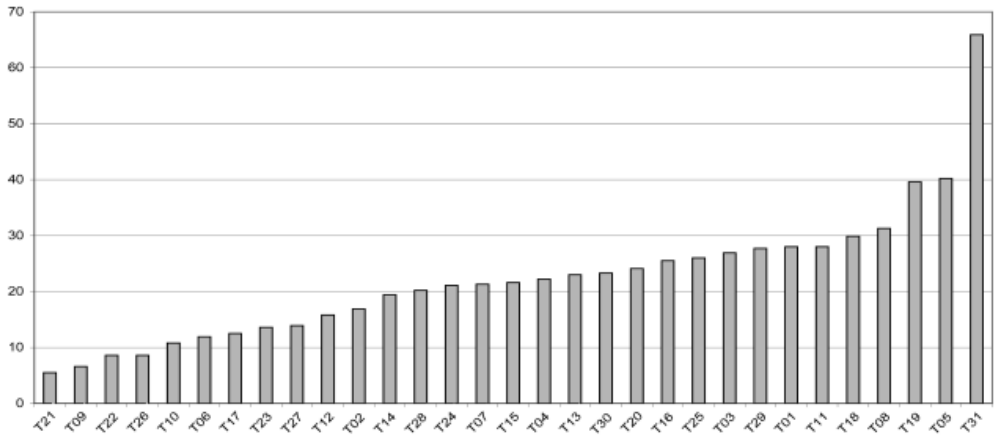


(T21 to T27 are subject ID's; the numbers in the Y-axis are percentages)

Next, we examine to what extent 13 month old bilingual children understand only one member (or singlets) of the 361 pairs of TE's. We find that all the children in our sample understand singlets (words in just one language and not in the other), and that there is also a large variation among the children in the number of singlets they understand (Fig. 2). On average, children in the sample understood only one member of the 361 possible translation equivalents in 22.30% of the cases, with a range between 5.50 and 65.90% ($SD = 11.90\%$). On average, there was no significant difference between the two languages as to which language was understood: The 22.30% of singlet understanding of translation equivalent pairs is the sum of the comprehension of just the French member of a TE pair (average = 10.90%, $SD = 13.30\%$) and of the comprehension of just the Dutch member of a TE pair (average = 11.40%, $SD = 8.40\%$). Although these averages are very similar for both languages, they mask the fact that some children understand singlets only or mainly in one of their languages, and that other children understand about as many singlets in one as in their other language. The range of variation is extensive. The main finding is that children understand both doublets and singlets, even at the young age of 13 months.

Figure 2

The proportion of translation equivalent pairs (N = 361) of which 31 bilingual French-Dutch children (13 months) understood only one member and not the other (singlets)



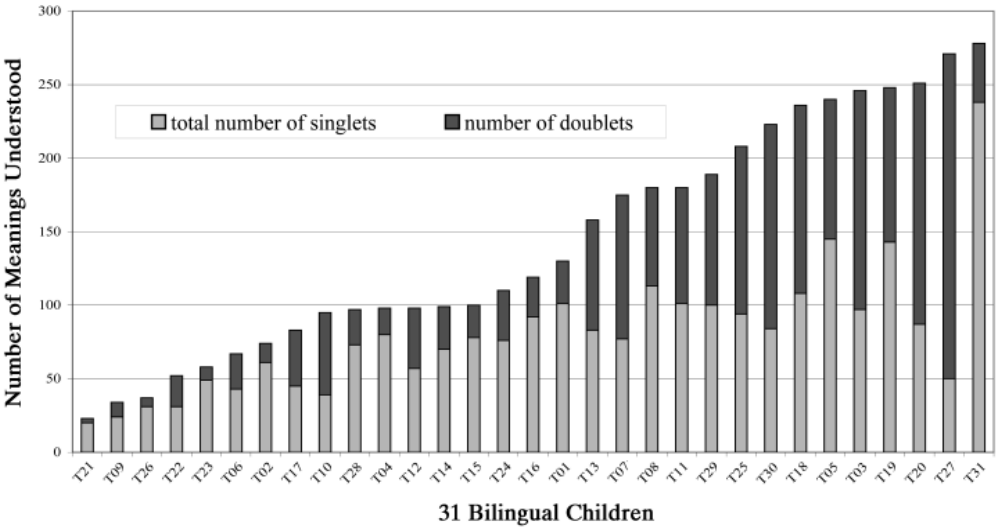
(T21 to 31 are subject ID's; the numbers in the Y-axis are percentages)

Furthermore, there is an inverse correlation between children's knowledge of singlets versus doublets. This relationship is tied to children's overall knowledge of the meanings as present in the 361 TE pairs under consideration here. The children who understand more meanings tend to understand these meanings in both their languages rather than just one. The number of doublets understood increases significantly as a function of the total number of translation equivalent meanings that the children understand ($r = .75$, $p < .001$). Viewed from the other perspective, the number of singlets understood decreases significantly as a function of the total number of TE meanings understood ($r = -.75$, $p < .001$) (Fig. 3). The fewer meanings a child understands (as present in 361 translation equivalent pairs), the more chance there is that that child will understand that meaning in just one language. Thus, increased meaning knowledge goes together with increased knowledge of two words (one in each language), rather than increased knowledge of words in just one language.

Figure 3 also shows that there is a three-way variation in the proportions to which children understand doublets and singlets. In this sample of 13 month old infants, 19 of the 31 bilingual children understand more singlets than doublets (Table 3). Twelve of these 19 children understand fewer TE meanings than the child representing the median (child T16). Four of the 31 bilingual children understand as many singlets as doublets. Two of these four children are just above the median, and the other two are under the median. Next, eight of the 31 bilingual children understand more doublets than singlets. Seven of these eight children are above the median. Thus, children who understand fewer TE meanings understand more singlets than doublets, and children who understand more doublets than singlets understand the most TE meanings. This confirms the correlational findings above that doublet knowledge (or the lack of it) is related to meaning knowledge.

Figure 3

Doublets and singlets relative to the overall level of comprehension of meanings expressed by 361 translation equivalents across the N-CDI and F-CDI



(T21 to T31 are subject ID's; the numbers in the Y-axis are raw figures)

Table 3

Doublet vs. singlet knowledge in 31 children as compared to their knowledge of 361 meanings

children understand...	*more singlets than doublets*	*as many doublets as singlets*	*more doublets than singlets*
children are *under* the median in terms of knowledge of 361 TE meanings	12	2	1
children are *above* the median in terms of knowledge of 361 TE meanings	7	2	7

Finally, our data based on the portions of the N-CDI and F-CDI that contain translation equivalents show that the bilingual children in our sample know more words than meanings. On average, the group of 31 bilingual children know 1.3844 words per meaning. This confirms that young bilingual children understand some words from the two languages referring to the same meaning, but this also shows that the overlap is nowhere near a total overlap (in that case, an average closer to 2 would be expected).

3.4
Recapitulation of main findings

At the age of 13 months, all the bilingual infants in our sample understand doublets, that is, both Dutch and French members of translation equivalent pairs. There is, however, a large variation amongst children both in the number and proportion of doublets understood, as well as in the number and proportion of singlets, that is, instances where only the French or the Dutch member of a translation equivalent pair is understood. The fact that the *SD* for singlets is 3.3 points smaller than that for doublets suggests that there is less variance in singlet understanding than in doublet understanding.

We also found a strong correlation between the total number of TE meanings that children understand and the number of their doublets: Children who understand more TE meanings, understand more doublets than singlets, and children who understand fewer TE meanings, understand more singlets than doublets. Thus, the more meanings a bilingual infant understands, the more the child will understand these meanings in two languages rather than in just one.

4 Discussion

We used an adult report measure to assess the status of word comprehension in very young bilingual children. Other, more cumbersome and time consuming measures could have been chosen as well, and an adult report measure, if quite practical, is not necessarily the best choice. As Tomasello and Mervis (1994) argued, using a parent report measure for comprehension in children younger than 11 months of age might not be very reliable. The implication is that reliability is much less of a problem with older children. Stiles (1994) also argued that, after the age of 16 months, asking parents about vocabulary comprehension might no longer be reliable, as it becomes very difficult around that age to separate lexical and grammatical knowledge (this is also why, in most Toddler forms of the CDI, language comprehension is no longer separately assessed). Stiles also observed that the decision strategies used by parents to assess comprehension may depend on individual and/or situational variables. For our study this means that different parents may have used different decision strategies in determining whether their child understands a word or not. However, we may assume that the same parent will use the same interpretation of what counts as comprehension, regardless of which language form he or she is filling out. In other words, cross-language comparisons for the same children will in principle be quite reliable, and more so than comparisons between children. Therefore some of the variation we found in the overall size of children's comprehension vocabularies may be due to caregivers' different interpretations of what constitutes comprehension, but our findings regarding the relative knowledge of one language compared to the other language are most likely reliable.

Another methodological limitation of our study is the fact that it is confined by the specific 361 translation equivalent pairs that constitute the N-CDI and F-CDI combined. Bilingual infants may hear many other translation equivalent pairs in their environments besides these. The relations between doublet and singlet understanding that we found could therefore be different. Our findings show, however, that 13-month old bilingual infants understand doublets as well as singlets.

What do our findings mean for any developing relation between young bilingual children's two languages? Our findings show that in early comprehension bilingual infants understand words from different languages that mean the same thing. As such, these children at age 13 months do not appear to be operating with any assumptions such as: "one form, one meaning" (they might have done so earlier, however, but had to soon abandon such assumptions given their lack of help in gaining more understanding of the bilingual world around them). In other words, nothing keeps bilingual infants from acquiring more forms for meanings (however shallow) that they already are familiar with. Thus, the suggestion that very young children "act as if words contrast in meaning and (…) reject apparent synonyms" (the Principle of Contrast, Clark, 1993, p. 92) is not supported, that is, if the "problem space" contains all of the language input that the child receives. If Contrast is said to hold only within one language, then we have the problem that we really do not know to what extent young bilingual infants have already tagged any one word for a particular language. Also, under the "one form, one meaning" assumption, in learning to understand words and associated meanings, infants would have to constantly check on hearing a new word X whether they already know a word Y with the same meaning in the same language A. If they do, they would block learning of X (because they already know Y for the same meaning in language A — see the Principle of Contrast). However, if the new word Y is in language B, children have no reason to block it, because they accept cross-language synonymy (if Contrast holds within one language only). It is unlikely that this cumbersome system constitutes a realistic scenario for early word comprehension in a bilingual setting. Rather, linking a word with a particular context, and thus learning something about its meaning, most likely happens on a need-to-know basis, regardless of what other words the child already understands.

It is of course possible that Contrast does hold, but only for monolingual children, who are used to far less variation in the input than bilingual children (De Houwer, 2005). Bilingual children are used to greater variation in input from very early on, and perhaps on that account they develop more flexible strategies to language learning than children exposed to less variation. One way to check on any differential influence of a purported Principle of Contrast would be to check bilingual children's use of Contrast within each of their languages. Our data do not lend themselves to such an analysis because the CDI is too limited an instrument to measure the comprehension of more or less synonymous words. Occasional synonyms do occur, but in the N-CDI they are listed as one two-pronged item (e.g., *appelsien/sinaasappel*—both meaning *orange* (the fruit), but the first term is more regionally determined, and the other more standard) so that it is impossible to say which term the child understands (or whether the child understands both). For the few words that might have a close synonym the CDI's tend to list only one (thus, the F-CDI lists *clémentine* but not *mandarine*—both mean *mandarin* in English, but have subtle meaning differences in French).

The fact that bilingual infants have learned to comprehend cross-language synonyms by the age of 13 months does not mean that they necessarily "know" that these cross-language synonyms refer to the same thing. The nature of early word learning is still too elusive and too connected up with specific interactional and situational

contexts (see, e.g., De Houwer & Gillis, 1998) to speculate on purely formal relations between the words that bilingual infants may understand.

Our study offers only a quantitative analysis of translation equivalents in comprehension. This, of course, yields only limited findings. A more qualitative analysis would need to be carried out to investigate whether there are any categories of words or even individual word pairs that are more generally known to most of the children, or, instead, whether translation equivalent learning is highly individualized. The latter case would provide additional evidence for the effect of the particular kind of input that children happen to receive. A quantitative study of input, on the other hand, would provide a useful avenue for exploring the reasons why we find such differences in levels of comprehension as well as in patterns of translation equivalent knowledge amongst bilingual children already in this very young sample. We possess some information on the relative amounts of input in each language addressed to the children and plan to pursue these possibilities in future studies.

The analyses presented in this paper have focused on comprehension only. However, as Clark (1988, p. 331) noted, because of the asymmetry between comprehension and production, Contrast should apply for comprehension and production separately. It remains to be seen whether the children in our sample, who all understand translation equivalents and thus show no evidence of Contrast for comprehension, might show evidence of Contrast in production at the same age. Qualitative comparisons between comprehension and production could yield further insight into the exact nature of the relation between them. This topic has not received adequate research attention in the bilingual acquisition literature. Our database makes it possible to investigate the relation between the two sides of word knowledge (comprehension and production), both within and across languages.

Becoming a bilingual is crucially linked to learning more than one form for one meaning. This accomplishment is evident already at the early age of 13 months. Very near the start of language comprehension at age 13 months, bilingual children, like bilingual adults, appear to understand meanings in one language as well as in both their languages. Thus, bilingual children do not rely on an overriding principle whereby one meaning is linked to one word form exclusively. Rather, as they come to understand more meanings, bilingual children learn to understand many of these meanings in each of their two languages. As such, early bilingual comprehension paves the way for early bilingual production, where other studies have shown the same pattern of meanings expressed in just one language, as well as meanings expressed in both.

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