Coordination strategies in Polish and the collective/distributive distinction

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1 Abstract

This paper is concerned with two conjunctive e-type coordination strategies in Polish and their semantic properties. The possible interpretations of these strategies and the restrictions on the type of predicate they may combine with do not only pose problems for standard assumptions about distributivity and collectivity but also grant insight into the structure of plural predicates in general. The discussion thereof will bear on the observations that have been made wrt. the behavior of the determiner all in English (cf. Dowty 1987). Moreover, additional requirements on the linguistic context the strategies may appear in will reveal some interesting parallels to constructions in other languages that have not been systematically investigated yet.

2 Two types of coordination

Polish has two coordination strategies which seem to be morphologically related and can be used to conjoin two or more individual-denoting expressions: The ‘standard’ strategy illustrated in (1) and a corresponding ‘marked’ strategy (2) in which i occurs before every conjunct.

(1) Ewa (i) Karol i Iza palili w kuchni.
   Ewa.NOM (and) Karol.NOM and Iza.NOM smoke.PAST.PL in kitchen.LOC
   ‘Ewa, Karol and Iza were smoking in the kitchen.’

(2) I Ewa i Karol i Iza palili w kuchni.
    and Ewa.NOM and Karol.NOM and Iza.NOM smoke.PAST.PL in kitchen.LOC
    ‘Ewa, Karol and Iza were smoking in the kitchen.’

Combined with an ambiguous predicate like earn 100 euros the standard conjunction strategy may receive both a non-distributive and a distributive interpretation, i.e. (3) may be judged true in SCENARIO 1 and in SCENARIO 2.

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Ewa and Karol and Iza earned 100 euros.

In contrast, the marked construction forces a distributive interpretation w.r.t. ambiguous predicates – (5) is judged true in SCENARIO 2, but not in SCENARIO 1.

'Ewa, Karol and Iza earned 100 euros each.' (only distributive)

This would suggest that marked structures are always distributive, but, as illustrated in (6), they may also combine with collective predicates.

'Ewa, Karol and Iza met yesterday at 11.'

This pattern is clearly unexpected on most traditional accounts of conjunction (e.g. Link, 1983; Partee and Rooth, 1983; Landman, 1989). It does not only contradict common assumptions about how distributive, cumulative and collective interpretations are derived and related, but also provides new insights on the semantics of collective predicates in general (cf. Dowty, 1987; Hackl, 2002; Winter, 2001; Champollion, 2010 a.o.).

3 Theories of conjunction

Although there exist many semantic theories which are concerned with distributive and non-distributive interpretations of e-type conjunctions (Link, 1983; Partee and Rooth, 1983; Landman, 1989; Krifka, 1990; Schwarzchild, 1996; Winter, 2001 a.o.), the dichotomy observed in the Polish data poses a problem that has not been addressed yet. In the following discussion two classical theories (Link, 1983; Landman, 1989) will exemplify the positions found in the literature and the resulting difficulties.

In order to capture the denotations of plural expressions such as the girls or Mary, Sue and Ann, Link (1983) assumes that \( D_e \) is closed under sum (\( \oplus \))\(^1\). This allows us to distinguish and model three types of predicates: Collective predicates like meet primitively denote properties of pluralities, (7a). Distributive predicates like smoke (7b) – which obligatorily give rise

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\(^1\) The assumption is that the semantic domain \( D_e \), i.e. the set of possible denotations for constituents of type e, contains not only “atomic individuals” such as John or Mary, but also “plural individuals” such as the plural individual consisting of John, Mary and Sue. Plural individuals are formed by a sum operation \( \oplus \) defined on \( D_e \). There is a set \( AT \subseteq D_e \) of atomic individuals, a binary operation \( \oplus \) on \( D_e \) and a function \( f : (P(\{ AT \}) \setminus \{ \emptyset \}) \rightarrow D_e \) such that: 1) \( f(\{ a \}) = a \) for any \( a \in AT \), and 2) \( f \) is an isomorphism between the structures \( (P(\{ AT \}) \setminus \{ \emptyset \}, \cup) \) and \( (D_e, \oplus) \). This means that there is a one-to-one correspondence between plural individuals and nonempty sets of atomic individuals.
to distributive entailments – must be affixed or lexically supplemented with a distributivity operator and are only true of atomic individuals.

(7) a. $[\text{meet}] = \lambda x_e : x \not\in AT. \text{meet}(x)$ (where $AT \subseteq D_e : \{x \in D_e : \neg \exists y \leq x(y \neq x)\}$

b. $[\text{smoke}] = \lambda x_e : x \in AT. \text{smoke}(x)$

The distributive interpretation of ambiguous predicates like earn 100 euros, which may receive a distributive and a non-distributive (i.e. collective or cumulative) interpretation, results from affixing the VP with $D_{\text{pred}}$ (cf. Link [1987] a.o.).

(8) $[\text{d}_{\text{pred}}] = \lambda P(\text{et}). \lambda x_e. \forall y \leq AT x. P(y) = 1$

In general, one could assume that $D_{\text{pred}}$ is optional in sentences like (3), which contain the standard strategy and allow for both interpretations, whereas it is obligatory in sentences like (5) forcing a distributive interpretation. This would make the right predictions for sentences with ambiguous predicates, but collective interpretations of sentences with the marked strategy would remain unexplained. On the other hand, the morphological properties of the marked strategy suggest that the lack of a non-distributive interpretation should be accounted for in the DP semantics. For instance, one could assume that the distributive interpretation is due to an operator like (9), which applies to the subject DP.

(9) $[\text{D}_{\text{conj}}] = \lambda x_e. \lambda P(\text{et}). \forall y \leq AT x. P(y) = 1$

However, the fact that the marked strategy is compatible with collective predicates is also inconsistent with this assumption. Coordination strategies that involve conjunction particles, i.e. markers on each conjunct, exist in several other, typologically diverse languages (cf. Mitrović and Sauerland [2014] Szabolcsi [2015], Flor et al., 2017) and recent accounts propose to analyze them in terms of type-shifts (Mitrović and Sauerland [2014]) or postsuppositions (Szabolcsi [2015]). Either analysis predicts that such constructions will receive a distributive interpretation in all environments and does not consider the possibility of collective interpretations. More research is needed to address the question of whether conjunction particles can be analyzed cross-linguistically in a uniform way or whether we find distributional and interpretational differences across languages, but the Polish case clearly requires a semantic account that allows for more than one interpretation.

A slightly different distinction that is proposed in Landman [1989] (see also Link [1984]) is to enrich the ontology with intransparent groups which are formed via a group forming operation $\uparrow$ that maps sums of individuals onto atomic group individuals.

(10) $\uparrow$ is a one-one function from SUM into ATOM such that:

a. $\forall d \in \text{SUM-IND}: \uparrow (d) \in \text{GROUP}$

b. $\forall d \in \text{IND}: \uparrow (d) = d$

(11) $\downarrow$ is a function from ATOM onto SUM such that:

a. $\forall d \in \text{SUM}: \downarrow (\uparrow (d)) = d$

b. $\forall d \in \text{IND}: \downarrow (d) = d$

The operation $\uparrow$ maps sums of individuals to group individuals that count as atomic and the operation $\downarrow$ maps any group to the sum of its members, which is a non-atomic individual
unless the group has only one member. For instance, in addition to the sum \( m + s + a \), there is an individual \( \uparrow(m + s + a) \), which counts as atomic and can itself be part of a sum.

(12) a. \([\text{Mary COORD [Sue COORD Ann]]} = m + s + a\)
    b. \([\uparrow [\text{Mary COORD [Sue COORD Ann]]]} = \uparrow(m + s + a)\)

While distributive predicates are primitively true of singular individuals, collective predicates are true of groups and ambiguous predicates of both singular individuals and groups. Non-distributive (collective and cumulative) interpretations involve applying a collective predicate or an ambiguous predicate to an atomic group individual (not to a sum). Ambiguous predicates distribute down to the parts of a sum, but not to the parts of a group, since the group counts as an atomic individual. In this way it is also possible to modulate partly distributive readings, e.g. the reading of (13a) on which the predicate \( \text{earn 100 euros} \) distributes down to the atomic singular individual Mary on the one hand, and to the group individual consisting of Sue and Ann on the other hand.

(13) a. Mary and Sue and Ann earned 100 euros.
    b. \([\text{Mary COORD [Sue COORD Ann]} [\text{D}_{\text{pred}} [\text{earned 100 euros}]]}\]
    c. \([\text{Mary COORD \uparrow [Sue COORD Ann]}] = m + \uparrow(s + a)\]
    d. \([\text{D}_{\text{pred}} [\text{earned 100 euros}]] = \lambda x.e.\forall y \leq_{\text{AT}} x. [\text{earned 100 euros}](y) = 1\]
    e. \(13b = 1 \text{ iff } \forall y \leq_{\text{AT}} m + \uparrow(s + a). [\text{earned 100 euros}](y) = 1\)

Both strategies in Polish allow for such interpretations, i.e. (14a) and (14b) can be used to describe the mixed scenario in (15).

(14) a. Ewa || i Karol | i Iza zarobili 100 euro.
    Ewa.NOM and Karol.NOM and Iza.NOM earn.PAST.PL 100 euros
    ‘Ewa and Karol and Iza earned 100 euros.’
    b. I Ewa || i Karol | i Iza zarobili 100 euro.
    and Ewa.NOM and Karol.NOM and Iza.NOM earn.PAST.PL 100 euros
    ‘Ewa, Karol and Iza earned 100 euros.’

(15) SCENARIO 3: Ewa earned 100 euros, Karol earned 50 euros and Iza earned 50 euros.

Like in English, this kind of interpretation for (14a) becomes available when the first coordinator is realized overtly. Furthermore, there is a prosodic break after the first conjunct in (14a) and in (14b) (cf. Winter 2001, Wagner 2010). So it seems that groups or equivalent higher-order pluralities are needed anyway for the analysis of all possible interpretations of both coordination strategies in Polish. On Landman’s account only group-denoting expressions may combine with collective predicates, and, in general, these expressions should allow for non-distributive interpretations when combined with ambiguous predicates. But this is, of course, not what we find in Polish when looking at the marked strategy.

(16) I Ewa i Karol i Iza zarobili 100 euro.
    and Ewa.NOM and Karol.NOM and Iza.NOM earn.PAST.PL 100 euros
    ‘Ewa, Karol and Iza earned 100 euros each.’ (only distributive)
The question then is why a partly distributive – or one may say a partly non-distributive – group interpretation is available for (14b), but the group interpretation for the entire conjunction is excluded in examples like [5]/[16], although the marked construction can be combined with collective predicates.

4 Predicate type

A closer inspection reveals that only a certain subclass of collective predicates is compatible with the marked construction, namely the class of predicates that corresponds to what Champollion (2010) refers to as *gather*-type predicates, Winter (2001) calls set predicates and Hackl (2002) essentially plural predicates. This class includes predicates like *meet*, *hold hands* and *be similar* and may combine felicitously with a coordination of that sort.

(17) I and Ewa and Karol and Iza met refl yesterday at 11.
and Ewa and Karol and Iza met refl yesterday at 11
‘Ewa, Karol and Iza met yesterday at 11.’

(18) I and Ewa and Karol and Iza were holding hands.
and Ewa and Karol and Iza held refl prep hands
‘Ewa, Karol and Iza were holding hands.’

(19) I and Ewa and Karol and Iza are similar to each other.
and Ewa and Karol and Iza are similar to refl
‘Ewa, Karol and Iza are similar to each other.’

To a certain degree, *gather*-type predicates allow for distributive subentailments about the members of their plural subject (Dowty, 1987; Winter, 2001; Hackl, 2002; Champollion, 2010 a.o.). For instance, if Ewa, Karol and Iza met, then one may conclude that Ewa and Karol, Karol and Iza, and Ewa and Iza met. Other collective predicates, like e.g. *be numerous*, *be a couple* and *constitute a majority*, do not allow for such entailments. This class, which roughly corresponds to pure cardinality predicates in Dowty (1987), numerous-type predicates in Champollion (2010) and genuine collective predicates in Hackl (2002), yields unacceptable sentences when combined with the marked strategy.

(20)#I and Ewa and Karol and Iza were numerous
and Ewa and Karol and Iza were numerous

(21)#I and Ewa and Karol are couple
and Ewa and Karol are couple

(22)#I and Ewa and Karol and Iza constituted majority
and Ewa and Karol and Iza constituted majority

The former class of predicates is compatible with the plural determiner *all* (23), whereas the latter usually is not (24) (cf. Dowty, 1987).
Wszyscy studenci spotkali się wczoraj o 11 / trzymali się za ręce / są podobni do siebie.

‘All students met yesterday at 11/ were holding hands/ are similar to each other.’

All students were numerous / are couple / constituted majority.

But all can – in contrast to the marked strategy – receive a cumulative interpretation when combined with an ambiguous predicate as in (25).

All students earned 100 euros.

‘All students earned 100 euros.’ (distributive or cumulative)

In an analysis put forward in Hackl (2002), which is based on previous work on weak reciprocity by Beck (1999, 2001), gather-type predicates are treated as inherently reciprocal predicates, i.e. they contain a silent each other, and derived from reflexive predicates bearing a non-identity presupposition. The pluralized version of a predicate like meet yields the truth-conditions in (26).

\[ Ewa, Karol and Iza met = 1 \text{ iff for each individual that is part of the plural individual Ewa, Karol and Iza there is at least one other individual in Ewa, Karol and Iza who stands in the meet with each other relation to him or her} \]

The entailment pattern of sentences with gather-type predicates as well as the fact that all of the Polish examples that contain such a predicate involve a reflexive each other indicate that this analysis might be on the right track. At this point, however, it is not clear whether the truth-conditions in (26) are too weak for sentences that contain the marked strategy and how the meaning contribution of the conjunction particles may be characterized.

In summary, the status of the marked strategy remains somehow vague: On the one hand, this strategy and the determiner all are alike in that they are compatible only with gather-type predicates and stress the fact that every member of the plural subject takes part in the action expressed by the predicate (cf. Link 1983). They also share the property of being distributive with inherently distributive predicates like fall asleep, but being collective with collective predicates like meet (see Dowty 1987 for a discussion on the status of all). On the other hand, their behavior differs wrt. ambiguous predicates – in such environments the marked strategy only allows for distributive interpretations, whereas all is also compatible with cumulative ones. There, the marked strategy seems to pattern with the determiner every in that it forces a distributive reading. What exactly forces a distributive interpretation in such configurations and which properties make gather-type predicates compatible with the marked strategy and distinguish them from other collective predicates remain open questions for future research.
5 Contextual restrictions

In addition to the collective predicate type that matters for the marked construction, further limitations may be observed w.r.t. to the possible contexts it may appear in. While (28) is a felicitous utterance in CONTEXT 1, it cannot be uttered felicitously in CONTEXT 2.

(27) a. CONTEXT 1: Ewa, Karol and Iza are organizing a conference together. Over the last two weeks, they have tried to set up a meeting once a week, but it has never worked out for all of them. Two weeks ago, only Karol and Iza met. Last week, only Ewa and Iza met. But yesterday...

b. CONTEXT 2: Ewa, Karol and Iza are organizing a conference together. Over the last two weeks, they have tried to set up a meeting once a week and – surprisingly – it has worked out every week for all of them. Yesterday...

(28) I and Ewa i Karol i Iza spotkali się.
and Ewa and Karol and Iza met REFL
‘Ewa, Karol and Iza met.’

Intuitively, the sentence in (28) means “not only Ewa and Karol, but also Ewa, Karol and Iza met” and the previous context in (27a) suggests that a meeting in which all of them take part was unexpected in a way. This may be related to the requirement on the number of individuals involved: A sentence that contains only two conjuncts seems to be not interpretable at all (29).

(29) ?I and Ewa i Karol spotkali się.
and Ewa and Karol met REFL

Again, informally speaking (29) should mean something like “not only Ewa, but also Ewa and Karol met”, which is odd for several reasons. What is unclear at this point is what the exact requirements on the context are. Interestingly, a similar behavior has been observed for stressed and in German. While some authors have argued that stressed and cannot receive a non-distributive interpretation [Szabolcsi and Haddican 2004], it has been shown [Haslinger and Schmitt 2017] that it can combine with collective predicates, but only when it conjoins more than two conjuncts and all of the individual conjuncts are salient in the discourse. It remains to be seen whether the same restrictions hold for the marked Polish conjunction strategy. Relevant data for the determination of the crucial contextual factors may also include other uses of i, e.g. cases in which it functions (solely) as a focus particle.

6 Discussion

It has been shown that Polish has a conjunction strategy with conjunction particles which forces distributive interpretations wrt. ambiguous predicates, allows for collective interpretations with gather-type predicates and requires in collective contexts the number of conjuncts to be higher than two and the conjunction of them to be “unexpected”. This suggests that a) cumulative and collective interpretations have to be kept apart, while collective and distributive interpretations may have more in common than previously assumed, b) the class of collective predicates is indeed heterogenous and may involve reciprocal structures and c) i in such constructions does not only realize a sum operation, but also some kind of focus particle. Open questions for future work are 1) how the meaning of i can be characterized across
different constructions in Polish, 2) whether similar constructions in other languages exhibit
the same semantic properties and conjunction particles can be analyzed cross-linguistically
in a uniform way and 3) whether the negative counterpart construction \(\text{ani } A \text{ ani } B\) shows
the same peculiarities.

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