Dependent pluractionality in Piipaash (Yuman)

Piipaash (Yuman) has what, at first pass, look like standard dependent definites (e.g., Balusu 2006; Farkas 1997; Henderson 2014). In the following example, the affix *-xper-*, traditionally glossed 'each', occurs on a numeral that co-varies in the scope of a distributively interpreted subject—i.e., for each of Pam and Heather there is a distinct three pieces of bread she ate.

(1) Pam-sh Heather-m uudav-k paan xmuk-**xper**-m mash-k
Pam-NOM Heather-ASC accompany-SS bread three-**each**-DS eat.DU-REAL
'Pam and Heather each ate three pieces of bread.' (Gordon, 1986, p. 99)

Looking more broadly we see that *-xper-* has a wider distribution than markers of dependent indefinites in other languages discussed in the literature. Moreover, this distribution introduces two puzzles that we will solve in this talk by proposing a unified account of *-xper-* in terms of a novel kind of pluractionality that we dub *dependent pluractionality*. The core proposal is that in most previously discussed languages the relevant morphology marks an individual variable as dependent (i.e., the variable quantified over by a numeral or indefinite). In Piipaash (aka Maricopa), *-xper-* marks an an event variable as dependent. What is special about Piipaash is that a wide variety of expressions are verbal, including numerals, and have an event argument.

Puzzle 1: (1) shows that *-xper-* can mark dependent numerals. It can also mark verbs to yield the same effect. In (2) *-xper-* appears on *tuuwamp* 'turn' and marks the event argument as dependent. It must co-vary in the scope of the subject—i.e., for each there is a distinct event of turning it.

(2) mat-cham-k kwnyminy-m tuuwamp-**xper**-k
REFL-all-SS different-DS turn.PL-**each**-REAL
They all turned it around separately (Gordon, 1986, p. 144)

Already here we have a puzzle. How do we account for this apparently cross-categorical effect in a unified way, given that previous account of dependent indefinites in languages like Telugu, Hungarian, Kaqchikel, etc., all involve morphology restricted to numerals / indefinite quantifiers?

Puzzle 2 (Gil's Puzzle): In Gil's 1982 dissertation he correctly notes that *-xper-* marks distributive shares (i.e., expressions that co-vary in the scope of the distributive operator) across a variety of expressions. In that same work, Gil also notes an apparent counterexample to this generalization, which he never solves. In particular, *-xper-* can appear on certain conjunctions, where the conjoined nominals are interpreted as the distributive key.

(3) John-sh Bill-sh nyi-dush-**xper**-k 'ii xmok-m paaysh-k
John-NOM Bill-NOM PL.OBJ-be.DU-each-SS stick three.SG-DS carry.DU-REAL
John and Bill each carried three sticks. (Gil, 1982, p. 281, ex. 35c)

Here the existential verb, embedded under the subject, bears *-xper-*. Such examples disturbed Gil because *-xper* is inside the subject DP, yet this sentence has a similar interpretation as (1), where *-xper-* marks the object DP. We should only mark the latter if *-xper-* marked expressions co-varying under a distributively interpreted expression, not distributively interpreted expressions themselves.

The solution—dependent pluractionality: We argue that these two puzzles disappear, and that we get a uniform, truth-conditionally correct, and compositional semantics for *-xper-* if the event argument is dependent as in (4). Note that we have extended the dynamic, post-suppositional account of dependent indefinites in Henderson 2014 to the event domain and borrow his convention of using the *overline* to mark post-suppositions, which can be thought of as conditions that must be satisfied the output assignment(s) of any sentence in which it is interpreted (parallel to how a presupposition must be satisfied in the input assignment).

(4) *-xper-* $\rightsquigarrow \lambda V \lambda e[V(e) \wedge \overline{e >_\Theta 1}]$, where

a. $[\![e >_\Theta 1]\!]^{<G,H>} = T$ iff $G = H$ and $|\{e', e'' : e', e'' \in G(e)\ \&\ \Theta(e') \neq \Theta(e'')\}| > 1$
'The variable e stores more than one event across a set of assignment G just in case it stores at least two events that differ on Θ.'

Here, *-xper-* is an event modifier, appending a post-supposition to the event argument requiring it be evaluation plural in the output—that is, after interpreting a sentence with *-xper-*, there must be two assignment functions that map the dref e to different events, where "different event" means an event with different participants. Crucially, this requirement can only be met by expressions that distributively update variable assignments in a pointwise manner. Thus, *-xper-* would not be license by, say, a cumulativity operator, but only by expressions like bona fide distributive quantifiers—e.g., *matchamk kwnyminym* 'all different" in (2)—, or the standard DIST / δ operators in dynamic treatments of distributivity and quantification, which we take to be present in (1) licensing *-xper-*.

Consider the compositional implications. As an event modifier, *-xper-* is different from other markers of quantification dependence discussed in the literature. We predict it to able to apply any expression that is a predicate of events. Note in (1) that *xmok* 'three' bears switch reference marking, making it verbal and plausibly a predicate of events. In languages with verb-like numerals, we expect for dependent indefinites to behave differently, which could allow them to extend to all event-denoting expressions more broadly like (2). This is what wee see in Piipaash. In (5) we see a event-based numeral denotation, following Pasquereau 2020. which is true of events with n participants. Below, in (6) we see denotation of numeral bearing *-xper-*.

(5) *xmuk* $\rightsquigarrow \lambda e[|\text{TH}(e)| = 3]$

(6) *xmukxperm* $\rightsquigarrow \lambda e[|\text{TH}(e)| = 3 \wedge \overline{e >_{\text{TH}} 1}]$

Crucially, when that event argument is eventually existentially closed, it will have to co-vary in the scope of a distributively interpreted expression. The result is there must be at least two different events with different themes whose participants number three. This is what we want for (1).

Finally, we return to Gil's puzzle, which we are now in a position to explain. When we realize that *-xper-* targets an event denoting expressions, forcing the event argument to co-vary, the Gil's puzzle dissolves. Note in (3) that *-xper-* occurs on a the verb *dush* 'be', which is an a clause embedded under the subject noun phrase. It would have the following dependent interpretation, which can be satisfied if the subject of the main clause is interpreted distributively.

(7) *nyidushxperk* $\rightsquigarrow \lambda x \exists e \exists y[\text{BE}(e) \wedge \text{LOC}(e, y) \wedge \text{TH}(e) = x \wedge \overline{e >_{\text{TH}} 1}]$
'True of individuals that participate in at least two events of being at a location which have different themes stored in different assignments in the output.'

But, if the main clause subject is interpreted distributively, that distributivity operator can also take scope over the main clause, which is what is observed in (3). This solves Gil's puzzle—one VP is marked as dependent, a share, which allows a second VP to also be distributively interpreted.

In sum, we have shown how recognizing a novel kind of dependent expression, dependent pluractionality, allows for a unified account of distributivity by *-xper-* in Piipaash, and resolves a longstanding compositional problem first identify by Gil in 1982.

Selected References: Balusu 2006. Distributive reduplication in Telegu. Farkas 1997. Dependent indefinites. Gil 1982. Distributive numerals. Gordon 1986. Maricopa morphology and syntax. Henderson 2014. Dependent indefinites and their post-suppositions. Pasquereau 2020. A unique operator for verbal pluractionality and numeral distributivity.