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A developmental analysis of generic nouns in Southern Peruvian Quechua

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Abstract

Generic noun phrases (e.g., “*Cats* like to drink milk”) are a primary means by which adults express generalizations to children, yet they pose a challenging induction puzzle for learners. Although prior research has established that English speakers understand and produce generic noun phrases by preschool age, little is known regarding the cross-cultural generality of generic acquisition. Southern Peruvian Quechua provides a valuable comparison because, unlike English, it is a highly inflected language in which generics are marked by the *absence* rather than the *presence* of any linguistic markers. Moreover, Quechua is spoken in a cultural context that differs markedly from the highly educated, middle-class contexts within which earlier research on generics was conducted. We presented participants from 5 age groups (3-6, 7-9, 10-12, 14-35, and 36-90 years of age) with two tasks that examined the ability to distinguish generic from non-generic utterances. In Study 1, even the youngest children understood generics as applying broadly to a category (like “all”) and distinct from indefinite reference (“some”). However, there was a developmental lag before children understood that generics, unlike “all”, can include exceptions. Study 2 revealed that generic interpretations are more frequent for utterances that (a) lack specifying markers and (b) are animate. Altogether, generic interpretations are found among the youngest participants, and may be a default mode of quantification. These data demonstrate the cross-cultural importance of generic information in linguistic expression.

A developmental analysis of generic nouns in Southern Peruvian Quechua

Generic noun phrases (e.g., “*Dogs* like to chew bones”) are an important means of expressing generalizations to children. Generic noun phrases refer to *kinds* as opposed to individuals (Carlson & Pelletier, 1995). Much of our world knowledge concerns kinds, yet kinds are abstractions (Prasada, 2000). Although one can view instances of a kind (e.g., Lassie, Rover, Rin-tin-tin), one can never view the kind fully or directly (e.g., dogs as a class). For this reason, generic language is a particularly crucial source of information to children regarding generic knowledge.

Prior research on children learning English has found that generics are common in child-directed speech (Gelman, Coley, Rosengren, Hartman, & Pappas, 1998), produced from an early age (Gelman, Goetz, Sarnecka, & Flukes, 2008), and understood appropriately by age 3 or 4 years (Chambers, Graham, & Turner, 2008; Cimpian & Markman, 2008; Gelman & Raman, 2003). Moreover, 4-year-old English-speaking children distinguish generics from the quantifiers “all” and “some” (Hollander, Gelman, & Star, 2002). Similarly, generics are found in both parents and children speaking Mandarin (Gelman & Tardif, 1998; Goldin-Meadow, Gelman, & Mylander, 2005), despite earlier claims that generics should be difficult for Chinese speakers due to the relative absence of explicit formal marking of such expressions in Mandarin (Bloom, 1981; see Gelman & Tardif, 1998 for review and refutation).

Although prior research has established that English speakers understand and produce generic noun phrases by preschool age, little is known regarding the cross-cultural generality of generic acquisition. Southern Peruvian Quechua (henceforth “Quechua”)¹, a South American indigenous language spoken primarily (though not exclusively) in Peru (Mannheim, 1991), provides a valuable comparison for two reasons. The first basis of comparison is that Quechua, unlike English, it is a highly inflected language in which generics are marked by the *absence* rather than the *presence* of linguistic markers. The language is structurally very different from languages in which generic use has been studied previously (English and Mandarin). Quechua is an SOV (subject-object-verb) agglutinative language, or Type III on Greenberg's (1963) typology. It is consistently right-headed. Its highly inflected, agglutinative, suffixing morphology is a direct consequence of the right-headedness, meaning that the mapping of semantic representation onto morphological form is largely transparent (see Muysken 1981, 1986; Weber, 1976). Most notably for present purposes, Quechua includes up to 3 or 4 suffixes on any noun and up to 5 to 10 on any verb. Generics are unmarked morphologically, as they are expressed by the absence of specifying markers (such as tense or aspect on the verb).

Consider sentences (i) and (ii):

i. Waka q'achuta mihun.

Waka q'achu-ta mihu-n.

Bovine forage-acc. eat-3

Bovines eat forage.

ii. Wakaqa q'achutan mihushan watananpi.

Waka-qa q'achu-ta-n mihu-sha-n wata-na-n-pi.

Bovine-topic forage-acc-evid eat-durative-3 tie-material nom.-3poss-loc.

‘The cow is eating forage at its hitching post.’

Sentence (i) refers to the eating habits of bovines in general. (Even though “waka” is a loanword, from the Spanish *vaca* ‘cow’, Quechua speakers use it indistinctive of the sex of the animal.) Notice that the morphological marking on this sentence is minimal—*waka* ‘bovine’ is bare and indeterminate as to number; *q'achu* ‘forage’ is marked only as the object of the verb; and *mihu-* ‘to eat’ is in the third person, with no tense, aspect, or number marking.

¹“Quechua” is a family of related languages, analogous to Romance. By “Southern Peruvian Quechua” we mean the linguistic continuum that includes the Bolivian and Argentine varieties of Quechua and those varieties spoken in the six Southeastern departments of Peru (i.e., Quechua sureño; Cerrón-Palomino, 1987; Mannheim, 1991). These varieties can be characterized by an overlapping lexicon and pragmatics, and a morphosyntax whose variability is as yet undetermined.

Sentence (ii) (from Cusihamán Gutiérrez, 1976, p. 238) refers to a specific bovine, the one that is tied to the hitching post. The utterance is marked with the evidential suffix *-mi* (here in its allomorph *-n*), making *q'achu-ta* 'forage' the focus of the utterance. The left boundary of the focus is marked by *-qa* on the subject *waka*. The verb *mihu-* 'to eat' is marked with the durative *-sha*, indicating that the action is ongoing (thereby marking aspect, though not tense). The specificity of the bovine is marked not only by saying that it is tied to the hitching post, but also by the extra grammatical machinery (specifically, *-sha*, *-mi*, and *-qa*)—even though *waka* is not under focus itself. Notice also that for monolingual Quechua speakers, *waka* can refer to either one or several bovine; it is not marked for number.

In contrast, generic interpretations in English are informed by two intersecting grammatical distinctions: definite versus indefinite—expressed in the use of articles—and plural versus singular (number). For example, "Barns are red" is generic, referring to barns as a category, whereas "The barns are red" or "The barn is red" are non-generic, referring to one or more particular barns. (See Carlson & Pelletier, 1995, Gelman, 2004, for more extensive discussion of generics in English, including the role of the verb and of pragmatic context.) Definiteness is not expressed in Quechua, and number is not obligatory. That is to say, one can express plurality, but the absence of a plural marker does not imply that a noun is singular, and Quechua does not require agreement in number in the verb nor does it have number agreement within the noun phrase. Syntactically, there is no single "generic construction"; rather, Quechua generics are grounded in the *absence* of specificity. In Quechua, generics are thus the default interpretations of noun phrases.

Because Quechua is systematically agglutinative and a highly inflected language, we can test the claim that generics are a default interpretation for children acquiring language (see also Chierchia, 1998, for a related suggestion). If children learn generics by noting the presence of linguistic cues, then Quechua should be a difficult language for children learning generics, because generics are unmarked morphologically. That is, Quechua includes no obligatory markings on the noun phrase that could cue genericity (e.g., no plurals or determiners). In contrast, if children learn generics by noting the absence of specificity markers, then Quechua should be particularly easy, because Quechua is a highly inflected language that marks specificity in numerous ways, including those not present in English. These are indicated in the examples below, with italics on the relevant portions in Quechua, and in parentheses for the English translations. For example, as in English, tense indicates specificity, because it places an event within a particular point in time (e.g., past); aspect indicates specificity, because it, too, places an event over a particular time period (e.g., durative). The evidential suggests that the event is one that the speaker personally observed, and therefore is not generic.² It is the absence of these markers that signals genericity to adults.

(iii) Wakaqa q'achutas mihuran.

I'm told (evidential) that the cow ate the forage. (evidential + tense)

(iv) Wakaqa q'achutan mihuran.

I vouch (evidential) that the cow ate the forage. (evidential + tense)

(v) Wakaqa q'achutas mihushan.

I'm told (evidential) that the cow is eating the forage. (evidential + durative)

(vi) Wakaqa q'achutas mihushan.

²Evidentials can also be used to mark a speaker's personal claim to authority (Faller, 2002), when producing utterances that draw on encyclopedic knowledge as opposed to personal knowledge.

I vouch (evidential) that the cow is eating the forage. (evidential + durative)

(vii) Waka q'achuta mihunman.

The cow could eat the forage. (conditional)

The second respect in which Quechua provides an informative contrast to prior research is that the cultural context of Quechua speakers differs markedly from the highly educated, middle-class contexts within which earlier research on generics was conducted. Prior research has found that generics are particularly frequent in book-reading contexts (Gelman & Tardif, 1998), and may be associated with a pedagogical stance (Csibra & Gergely, 2009). Thus, in the U.S., generics are often found in informational films and television programs, non-fiction books, and instructional contexts. To date, little research has examined whether generics are also found and early-acquired in a cultural context that has many fewer books and much less focus on formal schooling.

By comparison, the present studies focus on native Quechua speakers in a rural setting, with an agropastoral economy. The community is located in the central Andes, in the vicinity of the former Inka capital, Cuzco, in a mountainous region, with access to high valley lands producing maize and grains as well as to puna lands used primarily for grazing camelids. While the agricultural, valley settlements in the community are nucleated, the herding settlements are dispersed, with small clusters of one to three houses surrounded by pasture land, but still within an easy walk of each other. Children in these households have few if any books at home, little access to movies or TV (indeed TV programs are in Spanish, and so generally unintelligible to children), and no computers (at home or in the schools). Parental educational level is much lower than the U.S. samples, with most parents receiving at most a 5th-grade education.

Are generics just a middle-class phenomenon, used when parents are attempting to be particularly didactic, or are they also found when parents have little formal education and few books? The ubiquity of generics in ordinary parent-child conversations in both the U.S. and China would seem to argue that generic expression is quite general cross-culturally, but all of the participant populations that have been studied to date have been relatively well-educated, urban or suburban, with ready access to books, TV, and newspapers. The present studies provide information about a very different cultural and economic context.

The Present Studies

We conducted two studies with participants ranging in age from early childhood through adulthood. The broad goal of the research is to examine generics from a cross-linguistic, cross-cultural perspective. Southern Peruvian Quechua was selected for study as it provides an informative linguistic and cultural contrast to prior research on generics. Within this broad framework, we examine three specific research questions:

(1) What is the developmental course of generic acquisition?—Regarding the process of acquiring generics, two competing hypotheses have been raised in prior work. One view, the associative learning view, suggests that generics are most readily learned by association, namely, the linking of overt morphological cues to overt real-world referents (see Smith, Jones, & Landau, 1996, for this view of language learning). A competing view, the generics-as-default view, suggests that generics may be a default interpretation, reached in the absence of specifying markers (see also Krifka et al., 1995). On this view, generics are assumed when specifying markers (linguistic or nonlinguistic) are absent – in other words, generics are linguistically unmarked. (Suggesting that generics are a default does not imply that generics are somehow simpler, easier, or more basic than specifics.) However, the previous languages studied did not permit a convincing test either way, because they were

not morphologically rich (English, Mandarin) and because generics did receive some morphological marking (English). By examining generic acquisition in a morphologically rich language, we can examine directly whether generics are acquired early in development, in the absence of overt cues.

(2) What are the semantic implications of generics?—For English speakers, generics apply broadly to a category (like “all”) but admit of exceptions (like “some”) (Hollander, Gelman, & Star, 2002). Thus, generics do not reduce to a single quantifier, but have commonalities with both (see also Cimpian, Gelman, & Brandone, in press, for further discussion). Furthermore, among English speakers, generics are preferentially used to refer to animate kinds, perhaps due to the structure of animal kinds as capturing many similarities and being readily essentialized (Brandone & Gelman, 2009; Gelman, Goetz, Sarnecka, & Flukes, 2008; Goldin-Meadow et al., 2005). We wished to know whether these distinctive aspects of generics could be found among speakers of Quechua, despite the linguistic and cultural differences across these language communities. Study 1 examines the scope of generics relative to “all” and “some”, and Study 2 examines whether animacy encourages a generic interpretation.

(3) When are generics acquired relative to quantifiers?—Hollander et al. (2002) found that generics are learned before the quantifiers “all” and “some”, and that under demanding circumstances, 3-year-olds in fact interpret “all” and “some” as if they were generic. Leslie (2008) likewise suggests that children “handle generics with far greater ease than explicit quantifiers.” However, the only data showing that generics are learned earlier than quantifiers is with English-speaking 3-year-olds. Examining another population and another language could provide converging evidence on the issue.

Study 1 examines all three research questions, comparing generics with the quantifiers “all” and “some” in Quechua. Participants ranging from 3 to 90 years of age received a series of yes/no questions that included “all” (“lliw” or “llapa”; these are variants of “all”; see Faller & Hastings, 2008), “some” (“wakin”, which implies non-universality; Faller & Hastings, 2008), or generics (from Hollander et al., 2002). For example, some participants heard “Are dogs brown?” (generic), some heard “Are all dogs brown?” (“all”), and others heard “Are some dogs brown?” (“some”). This task tests participants’ sensitivity to the distinctions between generics and two closely related quantifiers.

An important aspect of the design of Study 1 is that it includes three types of properties, which we call “broad-range”, “narrow-range”, and “anomalous”. Broad-range properties apply to the category as a whole (e.g., Do babies have noses?); narrow-range properties apply only to a subset of the category (e.g., Are dogs brown?); and anomalous properties apply to no members of the category (e.g., Do foxes wear watches?). These properties permit testing whether generics apply generally to a category (like “all”) but also admit of exceptions (like “some”). For adults, the quantifier “all” (*llapa*, *lliw*) should apply to broad-range properties only (e.g., all babies have noses, but not all dogs are brown). The quantifier “some” (*wakin*, which is contrastive with “all”) should apply to narrow-range properties only (e.g., some dogs are brown, but it's not the case that *only* some babies have noses).³ (Although in English, “some” can apply to both narrow- and broad-range properties, in Quechua, “some” is restricted to narrow-range contexts; Faller & Hastings, 2008, p. 307.) In

³In many languages, such as English, “some” means “at least one”, so that it is literally correct to assert “Some babies have noses.” Nonetheless, “some” is often interpreted as contrasting with other, more informative quantification terms (and therefore implying, for example, “not all”). This pragmatic inference is known as a scalar implicature (Noveck, 2001). The ability to derive scalar implicatures undergoes developmental change, such that younger children tend to apply a logical interpretation whereas older children tend to apply a pragmatic one (Musolino & Lidz, 2006; Noveck, 2001; Papafragou & Musolino, 2003).

contrast, generics should apply to both broad-range properties (babies have noses) and (to lesser extent) narrow-range properties (dogs are brown). The extent to which generics apply to the narrow-range properties is likely to reflect how typical or central the property is of the category (Cimpian & Markman, 2009; Prasada & Dillingham, 2006). Finally, anomalous items were included so that there were some items for which a response of “no” was clearly appropriate, to discourage a strategy of responding “yes” to every question.

Study 2 focuses on the first two research questions. In this study, participants received a semantic interpretation task (from Gelman & Tardif, 1998), in which they were asked to judge, for a series of sentences, whether the target noun phrases referred to one, almost all, or just some (e.g., “A pig says oink” -- is that one pig, almost all pigs, or just some pigs?). This study manipulates two key linguistic factors that were hypothesized to inform generic judgments, namely: the absence of specifying markers and animacy.

Altogether, the two studies examine how Quechua speakers at different points in development interpret generic noun phrases, permitting us to examine semantic implications, developmental course, and relation to quantifiers.

STUDY 1: INTERPRETATION OF GENERICS VS. THE QUANTIFIERS “ALL” AND “SOME”

This study tests whether Quechua speakers interpret generic noun phrases as distinct from either an indefinite (“some”) interpretation or a universal quantifier (“all”) interpretation. We do so by asking a series of yes/no questions regarding the generic category, all members of the category, and some members of the category (e.g., “Do birds (all birds, some birds) have wings?”), using a task developed for English speakers by Hollander et al. (2002).

Method

Participants—Study 1 included 118 participants, divided into five age groups: 3 to 6 years ($N = 13$; M age = 5.2 years; 10 females, 3 males); 7 to 9 years ($N = 28$; M age = 8.0 years; 16 females, 12 males); 10 to 12 years ($N = 25$; M age = 10.9; 14 females, 11 males); 14 to 35 years ($N = 27$; M age = 23.4 years; 16 females, 11 males); and 36 to 90 years ($N = 25$; M age = 52.5 years; 17 females, 8 males). Ages were provided in years only; thus, the mean ages are only approximate. Six additional children who demonstrated a response bias in the post-test were also excluded. Participants were drawn from a set of small rural, mountain communities outside of Cuzco, Peru. The communities are largely monolingual in Quechua, that is, all day-to-day interaction within the communities is conducted entirely in Quechua, although the children are also learning Spanish in school.

Items—There were 36 items, one-third with wide-range properties (e.g., Do babies have noses?); one-third with narrow-range properties (e.g., Do hats have ties?); and one-third with anomalous properties (e.g., Do foxes wear watches?). Anomalous items were included so that there were some items for which a response of “no” was clearly appropriate, to discourage a strategy of responding “yes” to every question. The 12 items of each type were split into thirds, with one-third in each of the three wording conditions (generic, “all”, and “some”). Thus, there were 4 items for each of 9 cells (3 property types $\times$ 3 levels of wording). Assignment of item to wording condition was systematically varied so that each item appeared approximately equally often in each wording condition across participants, though each item appeared in only one wording condition for any given participant.

Items were based on those used in Hollander et al. (2002), but modified so that the property-category pairings would be familiar and culturally appropriate in this context. For example,

instead of asking “Do (all, some) bears have white fur?”, we asked, “Do (all, some) llamas have white fur?” (which in Quechua is worded, “Are (all, some) llamas’ fur white?”). The full set of items is provided in Appendix A. Table 1 provides sample wording for one set of items.

Procedure—Participants were tested individually, in a quiet area outdoors. The experimenter was a first-language speaker of Quechua, with considerable life experience in an agricultural community. Participants first received a simple 4-question warm-up task in which they were shown realistic color drawings of 4 items and asked a yes/no question about each (e.g., “Is this corn?” “Is this a spoon?”). For the warm-up task, half the correct answers were “yes” and half were “no”, to help convey that both yes and no answers were appropriate.

For the primary task, items were presented in three blocks: generic, “all”, and “some” in counterbalanced order. For each trial, the experimenter asked the participant to select a card (from a pile of laminated cards), and to place the card in a picture frame. (The frame was covered in Velcro, and the cards had Velcro backings, and so easily stuck to the frame.) The experimenter then read aloud the question on the card (with no expectation that the participant could read the question; most of the participants were in fact illiterate or only marginally literate), and wrote down the participant's response. No feedback was provided. The participant was then invited to remove the card from the Velcro frame before selecting the next item. The entire session was videotaped.

Post-test: A post-test was included to test comprehension of “all” and “some” with concrete and immediately perceptible referents (from Hollander, Gelman, & Star, 2002; modeled on a task developed by Smith, 1979, p. 439). There were 8 trials, 4 with “all” and 4 with “some.” For each trial, the experimenter showed the participant 4 crayons and a box, then placed 0, 2, 3, or 4 of the crayons into the box (leaving the remaining crayons, if any, in view outside the box) and asked: “Are all of the crayons in the box?” (Lliw lapis cajpichu?) or “Are some of the crayons in the box?” (Cajapichu wakin lapislla?). The questions were presented in two blocks, an “all” block and a “some” block, with order of the blocks counterbalanced across participants. The order of the questions within a block (0, 2, 3, or 4 crayons in the box) was randomized separately for each participant. The session was videotaped.

Transcription and coding: The videotapes were transcribed by trained, fluent Quechua speakers. Responses to the main task were coded as “yes”, “no”, “all”, “some”, implicit generic (repeating the subject noun phrase and/or verb, but without a quantifier), or other. Responses to the post-test were coded as “yes”, “no”, “all”, “some”, or other (typically this involved providing an exact number; e.g., “2”). Participants sometimes provided more than one response; all responses were included.

Results

The following responses were collapsed into an “agreement” category: “yes” (in all three conditions), “all” (in the ALL condition), “some” (in the SOME condition), and implicit generic (in the GENERIC condition). The following responses were collapsed into a “disagreement” category: “no” (in all three conditions), “some” or implicit generic (in the ALL condition), “all” or implicit generic (in the SOME condition), and “some” or “all” (in the GENERIC condition). All remaining responses were coded as “other” (neither agreement nor disagreement).

We had three primary hypotheses. First, we predicted that agreement in the “all” condition would be highest for the wide-range items. Second, we predicted that agreement in the

“some” condition would be highest for the narrow-range properties. Third, we predicted that participants would distinguish generics from both “all” and “some”. Specifically, we expected that generics, unlike “some”, would be considered broad in scope (and thus true of wide-range properties), but unlike “all” would also be acceptable for narrow-range properties. In other words, we predicted that generics could be used to express generalizations with exceptions (for example, dogs being brown). Finally, we predicted that endorsement of the anomalous properties would be low in all three wording conditions. These patterns were obtained for English-speaking adults as well as children above 3 years of age (Hollander et al., 2002).

To examine these predictions, we conducted a 5 (age group) $\times 3$ (wording: generic, “all”, “some”) $\times 3$ (property range: wide, narrow, anomalous) repeated-measures ANOVA, with age group as a between-subjects factor, and wording and property range as within-subjects factors. The dependent measure was the total number of agreement responses in each cell. See Figure 1 for results.

There was a main effect of age group, $F(4, 111) = 10.36$, $\eta^2 = .27$, $p < .001$, indicating that the youngest age group displayed a “yes” bias (yielding higher agreement scores than each of the other age groups, which did not differ significantly from one another, $ps < .001$ by Bonferroni's post-hoc tests). There was a main effect of property range, $F(2, 222) = 289.47$, $\eta^2 = .72$, $p < .001$. Post-hoc tests indicated that all three levels differed significantly from one another. Not surprisingly, participants most often agreed with wide-range properties ($M = 65\%$), followed by narrow-range properties ($M = 44\%$), and finally anomalous properties ($M = 19\%$), $ps < .001$, Bonferroni's.

A main effect of wording, $F(2, 222) = 54.77$, $\eta^2 = .33$, $p < .001$, indicated that generic questions yielded most agreement ($M = .53$), followed by “all” questions ($M = .46$), followed by “some” questions ($M = .29$), all $ps < .01$ by Bonferroni's. However, this effect is difficult to interpret without considering property range.

More interesting is the significant wording $\times$ property range interaction, $F(4, 444) = 116.73$, $\eta^2 = .51$, $p < .001$, which indicates that generics are distinct from both “all” and “some”. Specifically, for wide-range properties, “some” is lower than both generics and “all” (which do not differ from one another), and for narrow-range properties, “all” is lower than both generics and “some” (which do not differ from one another). For anomalous properties, agreement is low for all three wording conditions, which do not differ from one another. Taken together, these results indicate that speakers are loath to attribute wide-range properties to “some” (e.g., they disagree that “some babies have noses”), and are loath to attribute narrow-range properties to “all” (e.g., they disagree that “all llamas are white”). In contrast, generics function just like “all” when it comes to wide-range properties, and just like “some” when it comes to narrow-range properties.

Finally, there was a 3-way interaction involving property range $\times$ wording $\times$ age group, $F(16, 444) = 4.16$, $\eta^2 = .13$, $p < .001$, indicating that the effects above are moderated by age. Pairwise comparisons with Bonferroni tests revealed that there are two kinds of developmental changes. First, the youngest children have an overall agreement bias (noted earlier), such that youngest children show higher agreement scores than the four other age groups, for the quantifier “all” (narrow and anomalous property range), the quantifier “some” (wide, narrow, and anomalous property range), and generics (anomalous property range only). Second, and more interesting, the only significant developmental change after age 6 occurs with the quantifier “some” on the narrow-range properties, where there is a sharp increase in agreement rates between the ages of 7-to-9 and 14-to-35, $p < .01$.

To further examine the three-way interaction, we report the wording effects for each type of property range (wide, narrow, anomalous), within each of the five age groups considered separately. All reported effects here are significant at $p < .05$ by Bonferroni's test, unless otherwise specified.

Wide-range properties—At each age group considered individually, participants were more likely to agree with wide-range questions phrased with generics than with “some”, and more likely to agree with wide-range questions phrased with “all” than with “some”. In other words, participants in all age groups nearly always agreed that babies have noses, and that all babies have noses, but were much less likely to agree that some babies have noses. There were no differences between generics and “all”. Thus, with the wide-range properties, generics are treated as equivalent to “all” and as distinct from “some”. This pattern is true even for the youngest age (3 to 6 years).

Narrow-range properties—The younger two age groups (from 3 to 9 years of age) showed no differentiation among “all”, “some”, and generic, with regard to the narrow-range properties. In contrast, the older age groups all showed some differentiation. For the 10- to 12-year-olds, generics were higher than “all”, $p < .01$. For the 14- to 35-year-olds, all three wording conditions differed significantly: “some” was highest, followed by generics, with “all” the lowest, ps ranging from .07 to $< .001$. Finally, for the 36- to 90-year-olds, “some” was higher than “all”, with generics midway (though not significantly different from either). Thus, we see a late-emerging (somewhat inconsistent) distinction between generics and “all”: by 10 years of age, participants were reluctant to attribute a narrow-range property to “all” members of a category (e.g., they disagree that all llamas are white), were more willing to attribute such a property to “some” members of a category (e.g., they agree that some llamas are white), and treated generics as distinct from both “all” and “some”.

Anomalous properties—There were no significant wording effects for anomalous properties.

Post-test—Results of the post-test are shown in Figure 2. The following responses were collapsed into an “agreement” category: “yes” (in response to either ALL or SOME), “all” (in response to an ALL question), and “some” (in response to a SOME question). The following responses were collapsed into a “disagreement” category: “no” (in response to either ALL or SOME), “some” (in response to the ALL question), and “all” (in response to the SOME question). All remaining responses were coded as “other” (neither agreement nor disagreement).

To determine whether speakers were sensitive to the distinction between “all” and “some”, we conducted a series of paired t-tests, one for each pair of task trials (0, 2, 3, and 4 crayons, pairing “all” and “some”), separately within each age group. Response distributions for task trials involving 2, 3, and 4 crayons differed significantly for “all” vs. “some” wording, at all age groups. There were no significant differences involving task trials involving 0 crayons, as the vast majority of participants disagreed that either “all” or “some” crayons were in the box on that trial. Thus, even the youngest age group (average age 5 years) distinguished between “all” and “some” when the task involved concrete referents.

Discussion

Considering the sample as a whole, speakers of Quechua distinguish generics from both “all” and “some”. Generics are equivalent to “all” on wide-range properties (in both cases, readily interpreting the noun phrase as appropriately capturing wide-range properties), yet

are also treated as more similar to “some” on narrow-range properties (that is, permissible for expressing properties that admit of exceptions).

However, the developmental analyses reveal a more complicated picture. Of greatest interest was whether we would see any sensitivity to generics in the youngest age group. Importantly, we found that even the youngest children distinguished generics from “some,” indicating appropriate understanding that generics are broad in scope. However, for narrow-range properties, “all” and “some” are at first treated as indistinguishable from generics. “All” then pulls apart first (at about 10-12 years of age), and then “some” pulls apart (for adolescents and young adults). Thus, it was not until 10 years of age that children distinguished generics from “all”. We see a shift in children's interpretation of generics, at about 10 years of age, where generics are viewed not only as broad in scope (as with “all”), but also as admitting of exceptions (as with “some”).

At the same time, it is important to point out that most of the developmental changes in interpretation occurred with the quantifiers “all” and “some” rather than with generics. As is clear in Figure 1, interpretation of generics is quite stable across age groups (with the exception of the youngest children, who showed an “agreement” bias); what changes with age is the interpretation of “all” and “some”. Thus, it would seem that what children learn is that “all” does not allow exceptions, rather than that generics allow exceptions. This might at first seem surprising: how can there be changes in “all” and “some” up until adolescence, when the post-test showed such clear understanding by preschool age? One possibility is that the main task requires encyclopedic knowledge that is still developing in early childhood. Younger children may not yet have the requisite knowledge concerning the relationship between the categories and properties expressed in the study. On the other hand, given that participants at every age distinguish between wide- and narrow-range items, it appears that at least the basic knowledge of these categories and properties is available in even the youngest participants.

We suggest instead that children's difficulty concerns extending quantifiers to abstract sets. Whereas the post-test asked participants to apply “all” and “some” to concrete, countable sets, the main task asked participants to extend “all” and “some” to more abstract, uncountable sets. With this distinction in mind, it is not difficult to reconcile the excellent performance of the post-test to the elongated developmental trajectory of the main task. This finding that changes are located in the quantifiers rather than with generics is particularly interesting, as it is consistent with the notion that generics are a default mode of generalization for young children (see also Introduction and General Discussion).

In all age groups, “some” (*wakin*) was treated as distinct from “all” (*lliw* or *llapa*). This result is similar to findings reported by Noveck (2001), who found that for French speakers, adults treat “some” as pragmatically implying “not all” (only 41% of adults agreed that “Some giraffes have long necks”). However, in contrast to the present data, Noveck's study obtained striking developmental differences, where children (8 and 10 years of age) treated “some” as compatible with “all” (i.e., they have difficulty drawing the appropriate implicatures; but see Papafragou & Tantalou, 2004). The present findings presumably reflect the fact that *wakin* in Quechua is semantically contrastive with “all” (Faller & Hastings, 2008), and so does not require any pragmatic implicature in order for speakers to reach a “not-all” interpretation.

STUDY 2: SPECIFICITY AND ANIMACY CUES TO GENERICITY

Study 2 was designed to test whether the absence of specifying cues leads to a generic interpretation in Quechua. Empirical evidence of this relationship would provide further support for the generics-as-default interpretation. In order to provide such a test, we made

use of a task involving metalinguistic judgments, in which a series of sentences were presented, one at a time, and then participants were asked to provide a semantic interpretation of a key noun phrase in each sentence. Due to the more demanding task, only older participants were included in this study.

A second goal of the study was to determine whether animacy also contributes to generic interpretations in Quechua. Prior research has indicated that generics in English tend to be produced and understood more for animate categories than inanimate categories, even when equating for the amount of speech regarding each type of category (Gelman, Chesnick, & Waxman, 2005; Gelman, Coley, Rosengren, et al., 1998; Gelman, Goetz, Sarnecka, & Flukes, 2008; Gelman & Raman, 2003). This domain distinction was found even for wholly novel animals and artifacts about which speakers have no prior knowledge, and even when animals and artifacts are equated for featural similarity and overall complexity (Brandone & Gelman, 2008). Furthermore, this domain distinction obtained even for deaf children of hearing parents, who have received little or no conventional language input (Goldin-Meadow, Gelman, & Mylander, 2005). Although the basis for this distinction is unclear, some have argued that it reflects fundamental conceptual distinctions between animal categories (which are richly structured and essentialized) and categories of inanimate objects (which are much less so). For example, Brandone and Gelman (2008) suggest that animals may be more likely than artifacts to evoke the broader category of which they are a member (e.g., one may be more likely to think about dogs as a whole, when viewing a dog, than to think about chairs as a whole, when viewing a chair). They also suggest that speakers may assume that members of an animal kind share more kind-relevant properties than members of an artifact kind, due to domain-specific assumptions about animals versus artifacts. In any case, it is of interest to see whether the same domain distinction is found in a rural, Quechua-speaking peasant community.

Participants

Study 2 included 80 participants, divided into three age groups: 9 to 12 years ($N = 16$; M age = 11.3; 7 females, 8 males); 14 to 35 years ($N = 34$; M age = 23.2 years; 21 females, 13 males); and 36 to 90 years ($N = 30$; M age = 50.5 years; 20 females, 10 males). The majority of participants also completed the tasks in Study 1. Ages were provided in years only; thus, the mean ages are only approximate.

Items

See Table 2 for the full list of items. Each item consisted of a statement, followed by a forced-choice question that asked the participant to interpret a key noun phrase in the statement as referring to one (“huq”), almost all (“yaqa llapa”), or just some (“wakinllachu”). “Almost all” was considered a generic response; “one” and “just some” were considered non-generic responses. The 16 items were based on a set of sentences presented to speakers of English and Mandarin in Gelman and Tardif (1998, Study 3), in a study of generic interpretation. The sentences were translated into Quechua, and then divided into those for which specificity was marked overtly (e.g., past tense; imperative; durative) and those for which no markers of specificity were present. The various ways in which specificity is marked vary across the sentences. These sentences were further subdivided into those for which the target noun phrase was animate and those for which the target noun phrase was inanimate. Altogether, there were 10 non-specific sentences (4 animate, 6 inanimate) and 6 specific sentences (4 animate and 2 inanimate).

Procedure

Participants were tested individually, by the same researcher as in Study 1, in a quiet area outdoors. For each trial, the experimenter asked the participant to select a card (randomly

from a pile of laminated cards), and to place the card in a picture frame, as was done in Study 1. The experimenter then read aloud the sentence on the card, provided the three answer choices, and wrote down the participant's response. No feedback was provided. The participant was then invited to remove the card from the Velcro frame before selecting the next item. The entire session was videotaped.

Transcription and coding—The videotapes were transcribed by trained, fluent Quechua speakers. Although we provided 3 response choices (one, almost all, just some), participants did not limit themselves to these choices. Accordingly, responses were coded as “all” (including “almost all”), “some”, “one”, “many”, “a few” (which included the numbers 2 and 3), and other. Participants sometimes provided more than one response; all responses were included.

Results

Responses of “all” and “many” were collapsed into a generic code, and all other responses were collapsed into a non-generic code. Due to the unequal numbers of sentences of each type, all analyses are based on percentage scores. The percentage of generic responses was calculated for each cell of the design (non-specific animate; non-specific inanimate; specific animate; specific inanimate). These data were entered into a 3 (age group) $\times$ 2 (specificity: marked, absent) $\times$ 2 (animacy: animate, inanimate) ANOVA. See Figure 3.

As predicted, there was a main effect for specificity, $F(1, 77) = 175.31$, $\eta^2 = .70$, $p < .001$. Sentences without specifying markers were more often judged to be generic than sentences with specifying markers ($M_s = 69\%$ and 34% , respectively), indicating appropriate semantic interpretation in this sample. This effect interacted with age group, $F(2, 77) = 5.63$, $p = .005$, $\eta^2 = .13$, indicating that the specificity effect was strongest in the youngest age group. Nonetheless, the distinction between specific and non-specific sentences was quite powerful at all three ages, $p < .001$, Bonferroni's. There was also a main effect of animacy, $F(1, 77) = 29.05$, $p < .001$, $\eta^2 = .27$, showing that participants were more likely to interpret a sentence as generic when the target noun phrase was animate vs. inanimate ($M_s = 60\%$ and 43% , respectively). The animacy bias has also been found in English and Mandarin (e.g., Goldin-Meadow et al., 2005), and may reflect important conceptual distinctions between animals and inanimate objects. When examining the relative effect of specificity and animacy, it is apparent that specificity (namely, by absence of specifying markers) is a more powerful cue than animacy: inanimate NPs without specifying markers are more often interpreted as generic than animate NPs with specifying markers.

In order to examine whether the specificity effect holds up across items, we also examined scores on individual items. For sentences that included markers of specificity, generic scores on individual items ranged from 20-51%, whereas for sentences that did not include markers of specificity, generic scores on individual items ranged from 39-94%. A t -test comparing items (using items rather than participants) as the random factor) was statistically significant, $t(14) = 3.35$, $p < .01$. We can therefore conclude that the results of specificity hold up across the items and are not the result of just a small subset.

Discussion

Study 2 demonstrates a clear distinction between generics and non-generics in Quechua-speaking participants from 9 years of age and older. Specifically, sentences with overt markers of specificity are interpreted as non-generic, whereas sentences lacking any markers of specificity are interpreted as generic. This finding demonstrates that generics are a linguistic default, for speakers of Quechua.

Although the judgment task was a metalinguistic one that required directly reporting on the scope of targeted noun phrases, and although Quechua speakers have been reported to show difficulty with metalinguistic judgments (Mannheim, 1985; Vinden, 1996), participants were remarkably consistent in their responses. This indicates that the generic/non-generic distinction is at least partly accessible to conscious reflection, even in childhood.

One issue we have not yet addressed is the extent to which generic/non-generic judgments are influenced by sentence content, in addition to formal markers of specificity. For example, participants know that pigs (generically) say “oink”, and perhaps this by itself was sufficient to generate the appropriate semantic interpretation. We believe that content information of this sort is in fact very important in informing people's interpretations (e.g., the distinction between “I like rice” (generic) and “I want rice” (non-generic) lies in the semantics of the verb). Interestingly, one of the target sentences in Study 2 was ambiguous between a generic and specific interpretation, because of the verb: “Antuku alquta munakun” can be interpreted either as “*Antonio likes dogs.*” (generic) or “*Antonio wants a dog.*” (non-generic), and indeed participants were at-chance in providing a generic response on this item (44%). However, it is unlikely that content alone could account for the distinctions here. For example, “come and sit on your sheepskin” involves a property that is generically true of the target category (i.e., sheepskins generically are for sitting upon); nonetheless, other features of the sentence (e.g., the imperative) encourage a non-generic interpretation. Likewise, “the frog is not dancing anymore” also involves a property that is generically true of the target category (i.e., frogs generically do not dance); nonetheless, the presence of the word “anymore” signals a non-generic interpretation. In future research, it would be valuable to examine this issue more formally.

Another interesting finding was that participants provided more generic interpretations for animate noun phrases than for inanimate noun phrases. The lack of developmental differences between the youngest group (9- to 12-year-olds) and the two older groups may at first seem surprising, given that Study 1 yielded sizeable developmental changes, with 9- to 12-year-olds still not distinguishing generics from “some” on the narrow-range property items. However, this finding is perhaps not surprising when we consider that the developmental changes in Study 1 appear not to be with generics per se, but rather with children's interpretation of “all” and “some” (see Study 1 Discussion). Thus, the present findings provide more evidence that generic interpretation is fairly stable, at least from 10 years of age onward.

GENERAL DISCUSSION

A universal problem in conceptual development is figuring out which properties and facts refer to kinds rather than individuals. When a child discovers that his pet hamster gave birth to 5 babies, he must decide whether having so many offspring in one litter is peculiar to this individual hamster, or something that extends to hamsters more generally. Language is a crucial means of conveying kind-based information to children, given how difficult it is to refer to kinds in the absence of language. It is therefore important to understand how children acquire generics, and whether the acquisition process differs importantly depending on the particular language being learned.

We have argued that Quechua provides a telling contrast to prior studies of generics, for both linguistic and cultural reasons. Linguistically, Quechua is distinct from English and Mandarin (prior languages in which generics have received empirical study) in being highly agglutinating and expressing generics by means of an absence of specificity markers. Culturally, Quechua is distinct from prior study populations in being spoken in a rural

setting with few books or access to formal educational programming. We return to the three primary research questions listed in the introduction, and what the present results suggest.

(1) What is the developmental course of generic acquisition?

Two distinct proposals have been offered for this acquisition process. One is an associative learning mechanism, according to which words are learned by means of hearing certain repeated forms in the context of certain predictable perceptual features (Smith, Jones, & Landau, 1996). For example, “This is an X” is typically correlated with shape (e.g., “This is a book” is correlated with rectangular-shaped objects; “This is a snake” is correlated with long, thin objects; etc.), whereas “This is some X” is typically correlated with substance (e.g., “This is some sand” is correlated with granular substances; “This is some milk” is correlated with liquid, white substances). As children amass a database of experiences linking particular features of the world with particular features of the linguistic input, they can gradually acquire linguistic and conceptual distinctions, by means of associations.

An alternate proposal is that children reach a generic interpretation in the *absence* of specifying markers. In other words, children early on honor a conceptual distinction between generic and non-generic reference (see also Goldin-Meadow, Gelman, & Mylander, 2005; Leslie, 2008). When an utterance lacks any markers of indications of specificity, it is then that a generic interpretation is reached. Prior evidence in support of this position is the finding that children produce a range of generic forms from an early age (Gelman, Goetz, Sarnecka, & Flukes, 2008), and that in English, children show appropriate interpretation of generics before they learn the quantifiers “all” and “some” (Hollander, Gelman, & Flukes, 2002).

The present studies enable a new look at the generics-as-default hypothesis, by examining the acquisition of generics in Quechua, a highly inflected language that has many grammatical ways of indicating that an utterance is specific. These include tense affixes and aspectuals—both grammatical and lexical. Generics are the unmarked form; when tense and aspect are not marked in the utterance, then the utterance is plausibly generic. Thus, Quechua provides an important test of how children acquire generics. If children are looking for morphological indicators, then generics should be late-emerging in Quechua. However, if children treat generics as a default, then the morphological richness of Quechua should help children acquire this distinction.

Study 2 supports the generics-as-default position for Quechua, in that the absence of specifying markers strongly leads to a generic interpretation. Moreover, children as young as 3 years of age have no difficulty appreciating that an unmarked utterance can be interpreted as generally true. An important caveat is that children in the youngest age group do not have the same understanding of generics as the older children and adults. However, the youngest age group does show a very strong pattern of assuming that the absence of markers implies a generic interpretation. This finding provides important new data regarding the process of acquiring generics.

(2) What are the semantic implications of generics?

In the introduction, we identified three semantic implications of generics for speakers of English: they are broad in scope, they permit exceptions, and they are preferred for use with animate kinds. The present studies find support for early appreciation for two of these three semantic implications among speakers of Quechua as well: generics are treated as broad in scope (indeed, initially not distinct from “all”) and are preferred for use with animate kinds. It is only in middle childhood, however, that children distinguish generics from the universal quantifier. This developmental shift, from children initially interpreting generics as broadly

kind-referring (much like “all”), to distinguishing generics from “all”, occurs at about 10-12 years of age. This finding suggests that the breadth of generics may be more central than that generics permit exceptions. It will be important in future research to determine if this pattern (generality emerging before appreciation for exceptions) appears in children acquiring other languages as well.

(3) When are generics acquired relative to quantifiers?

One finding that replicates earlier work in English (Hollander et al., 2002) is that there is more developmental change for quantifiers than for generics. In Quechua, the interpretation of generics is unchanging from 7 years of age onward. In contrast, the developmental changes apparent in Study 1 are primarily centered in children's interpretation of the quantifiers “some” and “all”. This result is consistent with much prior work showing that quantifiers have a protracted developmental course (e.g., Brooks & Braine, 1996; Lidz & Musolino, 2002). It is also notable that children's difficulty with “some” persists despite the arguably easier semantics of “some” in Quechua, whereby “some” literally contrasts with “all” and thus does not pose the problem of scalar implicatures found in English. These findings support the view that generics are acquired earlier than quantifiers, and are consistent with the notion that a generic mode of generalization is a default in childhood (Leslie, 2008).

Overall, then, the present studies provide a novel test of the hypothesis that generics are a default. This hypothesis includes two distinct components: (1) that generics are assumed when there is an absence of specifying markers (linguistic or nonlinguistic) and thus are unmarked, and (2) that generics express a default mode of generalization (as opposite to quantification in formal logic; see Leslie, 2008). (As noted earlier, the hypothesis does not suggest that generics are somehow simpler, easier, or more basic than specific reference.) The present data provide two key pieces of evidence for generics as a default: (a) generics are inferred when specifying cues are absent (Study 2), and (b) generics are learned earlier than quantifiers (Study 1). In both senses, then, it would appear that generics are a default for young children.

One limitation of the present studies is their exclusive focus on participants' judgments of *scope*—that is, how an NP maps onto a certain proportion of a category. For example, adult speakers of both English and Quechua judge that the word “all” is broad in scope, applying to every instance in a set or category, whereas the word “some” is narrow in scope, applying to only a subset of instances in a set or category. The present findings reveal how generics are interpreted with regard to scope. However, it is important to acknowledge that the semantics of generics are more complex than this portrait would suggest. Generics do not reduce to any particular quantity or quantifier (Cimpian, Gelman, & Brandone, in press). For example, “Sharks attack humans” is judged to be true by adult speakers of English, even though only a small percentage of sharks actually do so, and “Sharks do NOT attack humans” is judged to be false, even though this property is true of most sharks. Generics also have implications for the kind of property that is expressed, at least for adults (i.e., that it is more inherent; Gelman & Bloom, 2007). Thus, although in the present investigation we make use of a set of tasks that assess property range, we do not mean to imply that scope is the full extent of how generics differ from quantified expressions.

A further limitation is that the present work only begins to examine the specifying markers of Quechua and how they contribute to generic judgments. It would be interesting to examine formal, semantic, and pragmatic cues that influence judgments of children as well as adults. Some of these cues are expected to work in similar ways across languages (e.g., the distinction between “like” and “want”, where the former is expected to result in a more consistently generic interpretation than the latter). However, other cues may be language-

specific. For example, the evidentials in Quechua (which express how a speaker has come to know or believe what they are reporting) mark the sentential focus, and so may be used to convey whether an utterance is or is not specific.

A final point we wish to emphasize is that these data demonstrate that generics are readily understood even in a cultural context that places relatively little emphasis on the sorts of didactic experiences in which middle-class, urban children are especially likely to hear generics (e.g., book-reading, library or museum visits, attendance at zoos, or educational programming on television; for evidence that book-reading especially prompts generics in both the U.S. and China, see Gelman & Tardif, 1998). Few of the households in these remote mountain villages owned more than a few books, most of the parents had only a few years of formal schooling, few owned televisions, and none owned computers. Nonetheless, generics are a fabric of everyday conversation, and readily acquired by children before they begin school. Generic language thus appears to have broad cross-cultural significance.

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Appendix

Appendix A

Materials for Study 1 (presented here in generic format).

	Quechua:	English:
WIDE-RANGE	Uywa mikhunchu?	Do (domestic) animals eat?
	Nina ruphanchu?	Do fires burn?
	Qina t'uquyuqchu?	Do flutes have holes?
	T'ika wiñanchu?	Do flowers grow?
	Huk'ucha chupayuqchu?	Do mice have tails?
	P'unchaypi rit'i unuyanchu?	Does snow melt in the sun?
	Carru llantayuqchu?	Do cars have wheels/tires?
	Caballu kunkayuqchu?	Do horses have necks?
	Quwi ñawiyuqchu?	Do guinea pigs have eyes?
	Wawa sinqayuqchu?	Do babies have noses?
NARROW-RANGE	Para apichu?	Is rain wet?
	Lapicero t'uqsinahinachu?	Are pens pointy?
	Llamaq millman yuraqchu?	Do llamas have white fur?
	Pukachu lliklla?	Are shawls red?
	T'ika q'illuchu?	Are flowers yellow?
	Papa hak'uchu?	Are potatoes grainy?
	Pullira azulchu?	Are skirts blue?
	Alqu ch'umpichu? / Are dogs brown?	Are dogs brown?
	Sumbreru watanayuqchu?	Do hats have ties?
	Runaq chukchan yuraqchu?	Do people have white hair?
	Muntirayuqchu sipas?	Do girls have (flat) hats?

	Quechua:	English:
	Punchu pallayniyuqchu?	Do ponchos have brocades?
	Michi yana piluyuqchu?	Do cats have black fur?
	Chaka k'aspimantachu?	Are bridges made of wood?
ANOMALOUS	Wawa phurumantachu ruwasqa?	Are children made of feathers?
	Challwa chumpiyuqchu?	Do fish wear belts?
	Fruta punkuyuqchu?chu	Do fruits have doors?
	Sapatu phusuquta ruwanchu?	Do shoes blow bubbles?
	Mach'aqway millmayuqchu?	Do lizards have wool?
	Muqu ventanayuqchu?	Do knees have windows?
	Lapis tusunchu? / Do pencils dance?	Do pencils dance?
	Kuntur chaki takllayuqchu?	Do condors have foot-plows?
	Rumi takinchu?	Do stones sing?
	Khuchi phalanchu?	Do pigs fly?
	Mallki takinchu?	Do trees sing?
	Atuq riluqniyuqchu?	Do foxes wear watches?

References

- Bloom, A. The linguistic shaping of thought: A study in the impact of language on thinking in China and the West. Lawrence Erlbaum Associates; Hillsdale, NJ: 1981.
- Brandone AC, Gelman SA. Differences in preschoolers' and adults' use of generics about animals and artifacts: A window onto a conceptual divide. *Cognition*. 2009; 110:1–22. [PubMed: 19046742]
- Brooks P, Braine M. What do children know about the universal quantifiers all and each? *Cognition*. 1996; 60:235–268. [PubMed: 8870514]
- Carlson, GN.; Pelletier, FJ., editors. The generic book. University of Chicago Press; Chicago: 1995.
- Cerrón-Palomino, RM. Lingüística quechua. Centro de Estudios Rurales Andinos “Bartolomé de la Casas.”; Cuzco: 1987.
- Chambers CG, Graham SA, Turner JN. When hearsay trumps evidence: How generic language guides preschoolers' inferences about unfamiliar things. *Language and Cognitive Processes*. 2008:1–18.
- Chierchia G. Reference to kinds across languages. *Natural Language Semantics*. 1998; 6:339–405.
- Cimpian A, Gelman SA, Brandone A. Generic sentences refer to inherent qualities rather than statistical regularities. *Language and Cognitive Processes*. in press.
- Cimpian A, Markman EM. Preschool children's use of cues to generic meaning. *Cognition*. 2008; 107:19–53. [PubMed: 17765216]
- Cimpian A, Markman EM. Information learned from generic language becomes central to children's biological concepts: Evidence from their open-ended explanations. *Cognition*. 2009; 113:14–25. [PubMed: 19674739]
- Csibra G, Gergely G. Natural pedagogy. *Trends in Cognitive Sciences*. 2009; 13:148–153. [PubMed: 19285912]
- Cusihamán Gutiérrez, A. Gramática quechua, Cuzco-Callao. Instituto de Estudios Peruanos; Lima: 1976.
- Faller, M. Semantics and pragmatics of evidentials in Cuzco Quechua. Doctoral dissertation in Linguistics, Stanford University; 2002.
- Faller, M.; Hastings, R. Cuzco Quechua quantifiers.. In: Matthewson, L., editor. Cross-linguistic perspectives on the semantics of quantification. Emerald Group Publishing; 2008. p. 277–317.
- Gelman, SA. Learning words for kinds: Generic noun phrases in acquisition.. In: Hall, DG.; Waxman, SR., editors. Weaving a lexicon. MIT Press; Cambridge, MA: 2004. p. 445–484.

- Gelman SA, Bloom P. Developmental changes in the understanding of generics. *Cognition*. 2007; 105:166–183. [PubMed: 17094957]
- Gelman SA, Chesnick R, Waxman SR. Mother-child conversations about pictures and objects: Referring to categories and individuals. *Child Development*. 2005; 76:1129–1143. [PubMed: 16274430]
- Gelman SA, Coley JD, Rosengren K, Hartman E, Pappas T. Beyond labeling: The role of maternal input in the acquisition of richly-structured categories. *Monographs of the Society for Research in Child Development*. 1998; 63(1) Serial No. 253.
- Gelman SA, Goetz PJ, Sarnecka BS, Flukes J. Generic language in parent-child conversations. *Language Learning and Development*. 2008; 4:1–31.
- Gelman SA, Raman L. Preschool children use linguistic form class and pragmatic cues to interpret generics. *Child Development*. 2003; 24:308–325. [PubMed: 12625452]
- Gelman SA, Tardif TZ. Generic noun phrases in English and Mandarin: An examination of child-directed speech. *Cognition*. 1998; 66:215–248. [PubMed: 9689770]
- Goldin-Meadow S, Gelman SA, Mylander C. Expressing generic concepts with and without a language model. *Cognition*. 2005; 96:109–126. [PubMed: 15925572]
- Greenberg, JH. Some universals of grammar with particular reference to the order of meaningful elements.. In: Greenberg, J., editor. *Universals of language*. MIT Press; Cambridge, MA: 1963. p. 73–113.
- Hollander MA, Gelman SA, Star J. Children's interpretation of generic noun phrases. *Developmental Psychology*. 2002; 38:883–894. [PubMed: 12428701]
- Krifka, M.; Pelletier, FJ.; Carlson, G.; ter Meulen, A.; Chierchia, G.; Link, G. Genericity: An introduction.. In: Carlson, G.; Pelletier, FJ., editors. *The generic book*. University of Chicago Press; Chicago: 1995. p. 1–124.
- Leslie SJ. Generics: Cognition and acquisition. *Philosophical Review*. 2008; 117:1–47.
- Lidz J, Musolino J. Children's command of quantification. *Cognition*. 2002; 84:113–154. [PubMed: 12175570]
- Mannheim B. Popular song, popular grammar, poetry and metalanguage. *Word*. 1985; 37:45–75.
- Mannheim, B. *The language of the Inka since the European invasion*. University of Texas Press; Austin, TX: 1991.
- Musolino J, Lidz J. Why children aren't universally successful with quantification. *Linguistics*. 2006; 44:817–852.
- Muysken, P. Quechua word structure.. In: Heny, F., editor. *Binding and filtering*. The MIT Press; Cambridge, MA: 1981. p. 279–326.
- Muysken P. Approaches to affix order. *Linguistics*. 1986; 24:629–643.
- Noveck IA. When children are more logical than adults: Experimental investigations of scalar implicature. *Cognition*. 2001; 78:165–188. [PubMed: 11074249]
- Papafragou A, Musolino J. Scalar implicatures: Experiments at the semantics-pragmatics interface. *Cognition*. 2003; 86:253–282. [PubMed: 12485740]
- Papafragou A, Tantalou N. The computation of implicatures by young children. *Language Acquisition*. 2004; 12:71–82.
- Prasada S. Acquiring generic knowledge. *Trends in Cognitive Sciences*. 2000; 4:66–72. [PubMed: 10652524]
- Prasada S, Dillingham EM. Principled and statistical connections in common sense conception. *Cognition*. 2006; 99:73–112. [PubMed: 16443448]
- Smith CL. Children's understanding of natural language hierarchies. *Journal of Experimental Child Psychology*. 1979; 27:437–458.
- Smith LB, Jones SS, Landau B. Naming in young children: A dumb attentional mechanism? *Cognition*. 1996; 60:143–171. [PubMed: 8811743]
- Vinden P. Junín Quechua children's understanding of mind. *Child Development*. 1996; 67:1707–1716.
- Weber, D. *Suffix-as-operator analysis and the grammar of successive encoding in Llacón Quechua*. Instituto Lingüístico de Verano; Yarinacocha: 1976.

(a) Wide-range items

(b) Narrow-range items

(c) Anomalous items

Figure 1.
Study 1, percentage agreement.

(a) Zero crayons (out of 4)

(b) Two crayons (out of 4)

(c) Three crayons (out of 4)

(d) Four crayons (out of 4)

Figure 2.

Study 1, post-test, mean percentage agreement as a function of quantifier and number of crayons.

Figure 3.
Study 2, mean percentage of generic responses as a function of age group, sentence type, and animacy of noun phrase.

Table 1

Study 1 sample wording.

Quechua	English	Item Type
Llapa ninachu ruphan?	Do all fires burn?	Wide-range
Wakin ninallachu ruphan?	Do some fires burn?	Wide-range
Nina ruphanchu?	Do fires burn?	Wide-range
Llapa llamaqchu millman yuraq?	Are all llamas' fur white?	Narrow-range
Wakin llamaqchu millmallan yuraq?	Are some llamas' fur white?	Narrow-range
Llamaq millman yuraqchu?	Are llamas' fur white?	Narrow-range
Lliw frutachu punkuyuq?	Do all fruits have doors?	Anomalous
Wakin frutallachu punkuyuq?	Do some fruits have doors?	Anomalous
Fruta punkuyuqchu?	Do fruits have doors?	Anomalous

Table 2

Study 2 items. Note: S=specific, N=non-specific, A=animate, I=inanimate. Specifying markers are indicated in red italics.

QUECHUA	ENGLISH	Specific	Animate
“Urrrr”nispa nin khuchiqa			
“Urrrr”ni-spa ni-n khuchi-qa			
“Urrrr”say-subord say-3 pig-topic	<i>A pig says oink. / Pigs say oink.</i>	N	A
Quwi mana bullachanchu, hinachu manachu?			
Quwi mana-Ø bulla-cha-n-chu, hina-chu mana-chu?			
Guinea pig not-Øev noise-make-3-qneg, like (that)-qneg, not-qneg	<i>A guinea pig doesn't make noise, does it? / Guinea pigs don't make noises, do they?</i>	N	A
Wawahina waqankichu?			
Wawa-hina waqankichu?			
Baby- like (that) cry-2-qneg	<i>Do you cry like a baby? / Do you cry like babies do?</i>	N	A
Antuku alquta munakun.			
Antuku alqu-ta muna-ku-n.	<i>Antonio likes/wants dogs. / Antonio wants a dog.</i>	N	A
Antonio (fam) dog-acc want/like-middle voice-3			
Cometaqa phalan.			
Cometa-qa phala-n.			
Kite-topic fly-3	<i>A kite flies. / Kites fly.</i>	N	I
Takllaqa tarpunapaq.			
Taklla-qa tarpu-na-paq.	<i>A plow is for planting. / Plows are for planting.</i>	N	I
Plow-qa plant-nominalizer-for			
Imata ruwakun mankawan?			
Ima-ta ruwa-ku-n manka-wan?	<i>What do you do with a pot? / What do you do with pots?</i>	N	I
What-acc do/make-middle voice-3 pot-with			
Misk'i gustasunkichu?			
Misk'i gustasunkichu?	<i>Do you like sweets?</i>	N	I
Sweet(s) please-3→2-qneg			
Trakturqa mana sinqayyuq.			
Traktur-qa mana-Ø sinqa-yuq.	<i>A tractor doesn't have a nose. / Tractors don't have noses.</i>	N	I
Tractor-top not-Øev nose-characterized by			
Muyu-muyuspa huch'uy ruedacha rin.			
Muyu muyu-spa huch'uy rueda-cha ri-n.	<i>Little wheels go round and round. / A little wheel goes round and round.</i>	N	I
Round (redup)-subord small Wheel-diminutive go-3			
K'ayra manaña tusunchu.			
K'ayra mana-ña-Ø tusu-n-chu.			
Frog not-anymore-Øev dance-3-qneg	<i>The frog is not dancing anymore.</i>	S	A
Turukuna qhiswa qhatapi tiyaran.			
Turu-kuna qhiswa qhata-pi tiya-ra-n.			
Bull-pl. valley side-loc be[in a location]-past-3	<i>The bulls lived on the side of the valley.</i>	S	A
Yaw, k'ayracha! Imata ruwashanki?			

QUECHUA	ENGLISH	Specific	Animate
Yaw, k'ayra-cha! Ima-ta ruwa-sha-nki?			
<u>Hey</u> , frog-diminate. What-acc do/make- <u>durative-2</u> (made specific by address)	Hey, little frog! What are you doing?	S	A
Khuruta rikurankichu?			
Khuru-ta riku-ra-nki-chu?			
Worm-acc. See- <u>past-2</u> -qneg	Did you see the worm/worms?	S	A
Tiyarikamuy qarayki patapi.			
Tiya-ri-ka-mu-y qara-yki pata-pi			
Sit-begin to-inward-starts somewhere else- <u>imperative</u> skin- <u>your</u> flat place-loc.	Come and sit on your sheepskin.	S	I
Yana rumichata haywamuwankimanchu?			
Yana rumi-cha-ta haywa-mu-wa-nki-man-chu?			
Dark Stone-dim-acc serve- starts somewhere else-1obj← <u>2</u> -cond-qneg	Can you hand me the dark stones?	S	I