

Why Functionalism Won't Function*

Clifton Pye
and
Pedro Quixtan Poz

The University of Kansas
Linguistics Department
Lawrence, KS 66045

Pye, C. & Quixtan Poz, P. 1989. Working Papers in Language Development, 4.39-53. The Child Language Program, University of Kansas.

Passive constructions present a challenge for any theory of language acquisition. It would be easy to explain how children acquire language if language was simply a 1-1 mapping from a semantic or functional base to syntactic structure. Agents could be subjects and patients could be objects and we could all get on with the task of communicating. The existence of passive constructions proves that direct mapping isn't a necessary requirement for human language. Active sentences may not even be the norm in some languages. Children cannot acquire language if they simply look for a direct mapping between agents and subjects or patients and objects.

The problem wouldn't be so insurmountable if children had some means of distinguishing between active and passive sentences. One possibility is that passive sentences might be functionally distinct from active sentences. A common belief is that passive sentences provide a means of focusing on or topicalizing patients while active sentences are more neutral or focus more on agents. Children could use such a functional dichotomy to suspend the agent = subject rule in order to acquire the passive. Presumably, positive evidence would then indicate the functional difference between active and passive sentences.

There are two immediate problems with such a scheme. The first is that languages have other means of focusing on objects besides passives. Word order and intonation are two devices in general use. If children assumed agent focus sentences were active and object focus sentences were passive they would construct a false distinction for languages that used word order or intonation rather than voice alternations as focusing devices. The second problem is that languages do not use passives exclusively to focus on object nps. Passives in many languages primarily encode an aspectual dimension. Thai and Japanese passives, for example, indicate that the subject has suffered in some way from the action. This makes possible the famous Japanese passive "I was died by my son." Passive constructions serve different functions in different languages. This implies that there will be considerable differences between languages in the range of verbs that have passives.

In order to test the theory that function is the primary determinant of children's acquisition of passives it is necessary to have some idea of the functions passives serve in different languages. A further requirement would be a functional theory that was explicit enough to make testable predictions about an order of functional development. Without such a theory there is not any reason to think that function per se plays a significant role in language acquisition. No one, for example, has a definitive list of functions that passives encode.

I will concentrate on the nonactive constructions in Quiche, a Mayan language spoken by 1.5 million people in the western highlands of Guatemala. There is an extensive literature treating active and nonactive sentences in Quiche and other Mayan languages from a functionalist perspective. After outlining the functional description of voice alternation in Quiche, I will address the issue of whether a functionalist treatment provides an adequate explanation of voice acquisition.

Quiche is an example of a pure head-marking language (Nichols 1986) which contains an ergative system of cross-referencing argument functions on the verb. A sample conjugational paradigm for transitive and intransitive verbs in Quiche is shown in (1).

(1) k-in-a-q'alu:j	'You hug me'	k-in-pe:tik	'I'm coming'
k-∅-a-q'alu:j	'You hug him'	k-at-pe:tik	'You're coming'
k-at-u-q'alu:j	'He hugs you'	k-∅-pe:tik	'He's coming'

The extensive system of cross-referencing licenses pro-drop in the language. Quiche speakers only use independent pronouns for emphasis or contrast. Thus, the use of independent pronouns is one device Quiche speakers may call upon to focus on a particular entity. Quiche clauses with transitive verbs seldom contain a subject noun phrase. My count showed that 14% of sentences with transitive verbs in a Quiche text contained subjects. Du Bois (1987) states the 6% of sentences with transitive verbs in the closely related language Sacapultec contain subjects. Quiche children use overt subjects with transitive verbs at roughly the same frequency as adult speakers or three times less frequently than children acquiring English.

Quiche has two forms of passive and antipassive voices in addition to the active voice. The two forms of the Quiche passive are similar to the English passive in that they promote an underlying object to the subject position and optionally allow the underlying subject to be expressed in an oblique phrase. One of the Quiche passives (or 'passive1' as Mondloch (1981) refers to it) is restricted to underlying subject NPs in the 3rd person. This passive cannot be used with logical subjects in the 1st or 2nd person. Grammatical and ungrammatical examples of this passive are shown in (2).

(2) a. k-θ-q'alu:-x ri: ak'al r-uma:l ri: u-na:n
 IMPERF-3A-hug-PASS1 the child 3E-cause the 3E-mother
 'The child is being hugged by his/her mother.'

b. * k-θ-q'alu:-x ri: ak'al w-uma:l
 IMPERF-3A-hug-PASS1 the child 1E-cause
 'The child is being hugged by me.'

Mondloch (1978) and others have observed that passive1 is used to distinguish between a 3rd person subject and object. The active form of the sentence in (2) is ambiguous; there is no unambiguous indicator of the subject. Even changing the word order does not affect a speaker's ability to distinguish the subject. The sentences in (3) can all mean the child is hugging his/her mother or his/her mother is hugging the child. The only difference between them is that the np in preverbal position is in focus. Quiche speakers use such sentences when the subject is apparent from previous discourse or the nonlinguistic context. This is an excellent example of the way languages may separate focus from other grammatical functions. Passive1 provides a means of unambiguously describing events involving two 3rd person antagonists. It is only secondarily used to focus on object nps.

(3) a. k-θ-u:-q'aluj ri: ak'al ri: u-na:n
 hug child his/her-mother

b. ri: ak'al k-θ-u:-q'aluj ri: u-na:n

c. ri: u-na:n k-θ-u:-q'aluj ri: ak'al

The second passive in Quiche (passive2) serves primarily an aspectual function. It can be used to express either the successful completion of an action or the fact that an action can be carried out successfully. An example of passive2 is shown in (4). As (4) demonstrates Quiche sentences in passive2 are acceptable with 1st and 2nd person oblique agents. Passive2 also

serves to distinguish between two 3rd person participants.

- (4) k-θ-q'alu-taj ri: ak'al aw-uma:l
IMPERF-3A-hug-PASS2 the child 2E-cause
'The child can be hugged by you.'

Quiche has two distinct forms of antipassive as well as passive voices. Antipassive voices are used to focus on the subject. The object is sometimes demoted to an oblique phrase. Like passives, antipassives convert transitive verbs to intransitive verbs. One consequence is that antipassive verbs, like passives, only allow the absolutive set of cross-referencing affixes to appear on the verb.

The focus antipassive is one of the more obscure constructions in Quiche. It is used when an underlying subject is moved to the focus position in front of the verb. This occurs in questions, relative clauses and sentence clefts. Examples of all three of these constructions appear in (5).

- (5) a. jachin x-θ-q'alu-n ri: ak'al
who PERF-3A-hug-FOC_AP the child
'Who hugged the child?'

- b. utz ri: winaq (ri:) k-e:-q'alu-n ri: ak'al
good the people (who) IMPERF-6A-hug-FOC_AP the child
'The people who hug the child are good.'

- c. are: ri: ak'al k-at-q'alu-n-ik
focus the child IMPERF-2A-hug-FOC_AP-TERM
'It is the child who is hugging you.'

There are no limitations on which verbs can appear in the focus antipassive, however either the subject or the object must be a third person np. As the example in (5c) shows, the verb agrees with whichever np is highest on an animacy hierarchy. If neither the subject or the object is a third person np then the active voice is used. This shows that the primary function of the focus antipassive is to distinguish between two 3rd person nps in the context of questions, relative clauses and clefts. Other languages, such as the Bantu language Sesotho, use passives in these contexts. The focus antipassive cannot be used if the subject and possessor of the object have the same referent. In such situations Quiche speakers use the regular active voice, see (6).

- (6) a. * are: ri: at x-at-q'alu-n ri: aw-alk'uwa'al
focus the you PERF-2A-hug-FOC_AP the 2E-children
'It was you who hugged your children.'

- b. are: ri: at x-e:-a-q'alu-j ri: aw-alk'uwa'al
focus the you PERF-6A-2E-hug-TERM the 2E-children
'It was you who hugged your children.'

The second antipassive construction in Quiche, the absolutive antipassive, is also productive in the language, but there are a number of transitive verbs which do not have absolutive forms (for example, *-esa:j* 'to take out', *-il* 'to see' *-cha:ji:j* 'to take care of', *-woq'e:j* 'to cry over'). A number of other verbs seem to appear almost exclusively in the absolutive, e.g. *-yaja-n* 'to scold', *-tzijo-n* 'to talk', and *-chaku-n* 'to work'. These verbs also demonstrate that the Quiche absolutive voice is not equivalent to the connative construction (e.g. *cut at*) which Guerssel et al. (1985) claim only applies to verbs whose conceptual structure contains an effect clause and a contact clause. In absolutive constructions the direct object np may optionally be expressed in an oblique phrase headed by a preposition, see (7). The absolutive can be used with two nonthird person nps.

(7) k-in-yoq'-on (che: le: in-ta:t) [from Mondloch 1981]
 IMPERF-1A-mock-ABS at the 1E-father
 'I mock (at my father).'

Mondloch (1981:186) states that one function of the absolutive voice is "to delete or demote an indefinite, obvious or insignificant transitive object." It can also be used to distinguish between a third person subject and object.

In case you haven't followed all of this strange language stuff, the main point is that the extensive cross-referencing system on the Quiche verb fails to distinguish between a third person subject and object. In such cases, Quiche speakers may use a passive or antipassive construction. In fact passives and the focus antipassive construction are limited to contexts where the active verb would be ambiguous. The focus properties of the passive and antipassive constructions are secondary. Quiche speakers use word order and pronouns as the primary focusing devices. The grammatical relations of subject and object in Quiche are relatively independent of focus or topicalization functions.

I can't see how functionalist theories would make any testable predictions about the Quiche voice types. In the rest of this paper I will point out some difficulties I found in attempting to develop a functionalist account.

One problem is that the nonactive voices in Quiche do not have the same function as their English counterparts. A perspective which emphasizes a similarity of function over form cannot predict how children acquire forms that serve different functions. In fact, it seems unreasonable in a functionalist theory even to compare the acquisition of passives in English and Quiche. It would probably be more legitimate to compare the children's use of passive in English with the Quiche children's use of variable word order and emphatic pronouns. Ultimately, functionalist theories don't permit very explicit hypotheses because no one knows any precise way of stating the functions of language independently of the forms which encode them. I can't tell you whether any Quiche form serves the exact function that passives play in English. I find it extremely unsettling to have a theory which claims it is illegitimate to compare English and Quiche passives.

For the sake of argument, however, let's ignore this problem and ask how the English and Quiche passives compare. Bresnan (1982) and Wasow (1978) argue that English actually contains two distinct types of passive rules. One operates at the syntactic level while the other operates at the lexical level. The lexical rule creates adjectival forms that may then undergo *un-* prefixation while the syntactic operation does not change the lexical category and, as

a result, does not feed the rule of *un-* prefixation. The only way a functionalist theory has of explaining this distinction is to assume that the two rules serve different functions. A functionalist theory cannot explain why one rule would have more exceptions than the other.

Will Norman (1978) has argued that the two Quiche passives may also be distinguished by assuming they result from the operation of rules on the syntactic and lexical levels. He argues that passive1 is a syntactic rule while passive2 is a lexical rule. Recall that passive2 adds its own aspectual meaning to the construction. It also changes the meaning of some verbs unpredictably and interacts with other rules in a way that is best explained by assuming it operates in the lexical component.

This raises an intriguing question of how the acquisition of lexical and syntactic passives in Quiche compares to their acquisition in English. A structuralist theory assumes there is a reason to compare the lexical rules with one another apart from the syntactic rules. A functionalist theory would not make such a distinction; it would only assume that these were four distinct rules with four distinct functions. It isn't even worth asking in general how the acquisition of lexical rules compares with the acquisition of syntactic rules in a functionalist theory.

Another problem I face in making a comparison between English and Quiche is that Quiche speakers use the passive voice more frequently than English speakers. There is no reason to associate differences in frequency exclusively with functionalist theories. Structuralist theories also predict that the frequency of any given form will reflect its use in different contexts. What functionalist theories need to show is that they make predictions that are attributable to differences in function, not frequency. The more frequent use of nonactive voices by Quiche caretakers is correlated with their children's more frequent usage. A rough comparison of the frequency of passives in English and Quiche is shown in (8)

(8) Comparison of passive frequencies in English and Quiche

English (from Pinker, Lebeaux & Frost 1987)

Children	Ages	MLU	Hours Recorded	No. of Passives
Adam	2;3-4;11	2.00-5.20	110	72
Eve	1;6-2;3	1.50-4.26	40	10
Sarah	2;3-5;1	1.74-4.10	139	32
Allison	1;5-2;10	1.73	4	2

Quiche

Al Tiyaan	2;1-2;10	1.07-3.30	16	19
Al Chaay	2;9-3;6	1.57-4.31	24	99
A Carlos	3;0-3;10	1.59-3.69	20	68

Van Valin (1987) provides the clearest discussion of voice acquisition from the standpoint of a functional theory of grammar. Foley & Van Valin's (1984) Role and Reference Grammar (RRG) distinguishes between two types of 'subjects.' Some languages select subjects solely on the basis of the np's semantic features. Other languages select subjects on the basis of the

pragmatic/discourse features of the nps. One characteristic of languages with pragmatic subjects is a passive or antipassive construction that changes the semantic role of the subject. Both English and Quiche are languages with pragmatic subjects.

Van Valin claims that RRG predicts children would first fail to distinguish between the different possible semantic roles of a pragmatic subject. They would treat all languages as though they contained only semantic subjects. This, he states, accounts for the failure of children learning English 'to comprehend passives correctly for a considerable period of time'. He contrasts the acquisition of the passive in English with the acquisition of passive in Sesotho, a southern Bantu language (cf. Demuth 1987). Sesotho also has a pragmatic subject, but Van Valin states that the crucial feature of the subject in Sesotho is that it is always definite, referential and highly topical. Van Valin claims that this 'direct form-function correlation' is responsible for the appearance of full passives in children's speech as early as 2.8 years. Thus, the guiding acquisition principle for Van Valin is the same as Karmiloff-Smith's (1979) or Dan Slobin's (1973) that one form should serve one function.

We can test Van Valin's proposal by seeing whether Quiche subjects are always 'definite, referential and highly topical.' If they are Van Valin predicts Quiche children would use nonactive voices as early as Sesotho-speaking children. If not, then Quiche children should use nonactive voices as late as English-speaking children. The disambiguating function of the nonactive voices in Quiche suggests that there is no requirement that Quiche subjects be definite, referential or highly topical. I list some sentences from a Quiche text and from my transcripts of adult Quiche speech in (9). As you can see, it is not necessary that Quiche subjects be definite.

(9) Quiche sentences with indefinite subjects

Quiche Text (Norman 1976)

3. xaq k'a te' xel la jun ayi:n pa le: ma:r.
Suddenly (there) came an alligator out of the ocean.

45. xa xnutij la jun ayi:n.
An alligator ate me.

98. xa: jun ayi:n xink'am-ow loq
Just an alligator brought-FOC_AP me here.

Quiche Transcripts

R1-33 N: k'o: jun iwich' katcha.
There is a little one you say.

R1-35 N: jachin ka'an-ow le: awa katcha chare.
Who makes-FOC_AP your bread you say to him.

R1-60 N: k'o: jun ixpeq dih.
There is a toad dear.

I will end without making any claims about the acquisition of nonactive voice in Quiche. I provide a list of the nonactive utterances the Quiche subjects used in their transcripts in the appendix. Readers may decide for themselves whether they think Quiche children use nonactive voices as early as Sesotho children or as late as English-speaking children. They may also check to see whether the children acquire the passives before or after the antipassives or whether they acquire the lexical passive₂ before or after the syntactic passive₁. My own feeling is that they do use the various nonactive voice constructions productively at an early stage. I do not think they do so because these constructions serve any especially useful function, but because the forms are a salient part of the Quiche input (cf. Pye 1980, 1983). I could be wrong, but it looks to me as though the structural characteristics of Quiche (especially the syllable-final stress placement) conspire to promote the early use of the many nonactive voice forms. In this Quiche provides an illuminating example of the interaction between form and function in language structure and language acquisition. No theory that is wholly structural or functional will successfully explain children's ability to acquire language.

Notes

* Data for this paper were collected in Guatemala while supported by the Organization of American States and the Wenner-Gren Foundation. This paper was presented at the Boston University Conference on Language Development, October 1988.

References

- Bresnan, J. W. 1982. Passive. In J. W. Bresnan (Ed), *The Mental Representation of Grammatical Relations*. Cambridge, MA: MIT Press.
- Demuth, Katherine. 1987. Subject, topic and acquisition of the Sesotho passive. ms. Boston University.
- Du Bois, John W. 1987. The discourse basis of ergativity. *Language* 63.805-855.
- Foley, William A. & Van Valin, Robert D. Jr. 1984. *Functional Syntax and Universal Grammar*. Cambridge: CUP.
- Guerssel, Mohamed, Kenneth Hale, Mary Laughren, Beth Levin & Josie White Eagle. 1985. Papers from the parasession on Causatives and Agentivity. *CLS* 21, part 2, pp. 48-63.
- Karmiloff-Smith, A. 1979. *A Functional Approach to Child Language: A Study of Determiners and Reference*. Cambridge: CUP.
- Mondloch, James. 1978. Disambiguating subjects and objects in Quiche. *Journal of Mayan Linguistics* 1.3-19.
- Mondloch, James. 1981. *Voice in Quiche Maya*. Unpublished doctoral dissertation, SUNY Albany.
- Nichols, J. 1986. Head-marking and dependent-marking grammar. *Language* 62. 56-119.
- Norman, W. 1976. Quiche text. In L. Furbee-Losee (Ed), *Mayan texts I (IJAL NATS, 1:1)*. Chicago: University of Chicago Press.
- Norman, W. M. 1978. Advancement rules and syntactic change: the loss of instrumental voice in Mayan. *Proceedings of the Fourth Annual Meeting Berkeley Linguistics Society*. Berkeley, California.

- Pinker S., D. S. Lebeaux & L. A. Frost. 1987. Productivity and constraints in the acquisition of the passive. *Cognition* 26.195-267.
- Pye, Clifton. 1980. The acquisition of grammatical morphemes in Quiche Mayan. Unpublished doctoral dissertation, The University of Pittsburgh.
- Pye, C. 1983. Mayan telegraphese: intonational determinants of inflectional development in Quiche Mayan. *Language* 59.583-604.
- Slobin, Dan I. 1973. Cognitive prerequisites for the development of grammar. In Ferguson & Slobin (Eds), *Studies of Child Language Development*. New York: Holt, Rinehart & Winston.
- Van Valin, Robert D. Jr. 1987. Some implications of a functionalist theory of syntax for language acquisition. ms. Linguistics Program, University of California, Davis.
- Wasow, T. 1977. Transformations and the lexicon. In P. Culicover, T. Wasow & A. Akmajian (Eds), *Formal Syntax*. New York: Academic Press.

Appendix

Nonactive voices in Quiche children's speech

Adult forms are shown in parentheses.

Al Tiyaan (2;1-2;10):

T2 7oh (xyow)	Focus Antipassive	'give'
T3 tiyonik in	Absolutive	'bite'
T7 nik (katoq'onik)	Absolutive	'peck'
T8 t'enik (kaxet'onik)	Absolutive	
T9 pa7ch (xpachik)	Passive1	'smash'
7anik (xaanik)	Passive1	'do'
T10 b'iix (xb'iix)	Passive1	'say'
pojonik (xpoqowik)	Focus Antipassive	'boil'
T11 pax (xpaax)	Passive1	'smash'
sachik (xesachik)	Passive1	'forget'
xik (xtiixik) 2x	Passive1	'spill'
T13 chupik (xchuupik)	Passive1	'blow out'
toq'opinik (xtoq'onik)	Absolutive	'peck'
q'upinik (xqupinik)	Absolutive	'cut'
T14 paqinik (xpaq'inik)	Absolutive	
t'ub'inik (xt'ub'inik)	Absolutive	
raminik (xraminik)	Absolutive	'rip'
ketzijunik (ketzijonik)	Absolutive	'talk'
qupin (xqupin)	Absolutive	'cut'

Al Chaay (2;9-3;6)

R3 no Lin loq' (xloq'owik)	Focus Antipassive	'buy'
R4 pax weech (xsipax) 2x	Passive1	'give'
R5 wixtaj nah (wiyextaj) 2x yox taj (kayox)	Emphatic Passive1	'wait'
chaap uj maal (xujchaap)	Passive1	'grab'
tijj maal chi (xtijj rumal)	Passive1	'eat'
R6 wextaj nah (wiyextaj) 3x looq' Xela (xlooq')	Emphatic Passive1	'wait' 'buy'
jan a Xa7n (kayajan)	Absolutive	'scold'
R7 jan tat in (kayajan)	Absolutive	'scold'
no loq'tajik (xloq'atajik)	Passive2	'buy'
R8 b'iix ak' (xb'iix)	Passive1	'said'
no chuup chik (xchuup)	Passive1	'put out'
no ah xik (kab'ixik)	Passive1	'said'
R9 k'an pin (xq'opinik)	Absolutive	
kup, kupijj (xq'upix)	* Passive1	'cut'
k'up jalom (xq'upix)	Passive1	'cut'
mer tijj ab' ali7 (xtijj)	Passive1	'eat'
R10 mera chi kaloq' (kaloq'ik)	Passive1	'buy'
luk yaaj, yaaj Juan (xyaaj)	Passive1	'scold'
tzilik tah (xutzirik)	Passive1	'cure'
no chiit wach tukut (xch'iit)	Passive1	'scratch'
yaa luk' manena (xyaa)	Passive1	'give'
no miich' uwii7 (xmiich')	Passive1	'pull'
R11 looq' wach (xlooq')	Passive1	'buy'
R12 no awuxik mich' (kamich'on)	Absolutive	'pull'
ch'akanik (xinch'akanik)3x	Absolutive	'win'
tijtaj chi jun mal xirwel (xtijtaj)	Passive2	'eat'
R13 e mal cho (x'ee rumaal)	Active with <i>-umaal</i>	

A Carlos (3;0-3;9)

C1 tijtajik (xtijtajik)	Passive2	'eat'
n kunax taj (kinkunax)	Passive1	'cure'
C2 chuupik (xchuupik)	Passive1	'blow out'
lok'owik (xloq'owik)	Focus Antipassive	'buy'
C4 innimanik (kintz'iib'anik)	Absolutive	'write'
C6 paax (xpaax)	Passive1	'smash'
C7 chapik (xchapik) 2x	Passive1	'catch'
sokotaj (xsokotaj taj)	Passive2	'wound'
chupix (xchupix)	Passive1	
t'iisik (kat'iisik)	Passive1	'sew'

kaayik (xch'aayik)	Passive1	'hit'
jatanik (xjat'ixik)	Passive1	'tie'
C8 chaapik (xchaap) 2x	Passive1	'catch'
at a7ayowik (xatyowik) 2x	Focus Antipassive	'give'
tixik (katixik)	Passive1	'spill'
xib'inik (kaxib'inik)	Absolutive	'scare'
towik (xtowik)	Focus Antipassive	'hear'
ti7ik (xti7ik)	Passive1	'bite'
chuup (xchuup) 3x	Passive1	'blow out'
ka7appisik (kapisik)	Passive1	'wrap'
elaq'axik (xelaq'axik)	Passive1	'steal'

Then move to Why Function Programming Matters. A few bullets: Functional programming allows you to reason about problems differently. Functional abstraction is very powerful and allows you to DRY up your code in ways not available to other paradigms. In our multi-core future, functional languages may be easier to split into simultaneous tasks (though not-strictly-functional languages are working hard on the problem as well). It's easier to prove that programs written in pure functional languages (no side effects) are mathematically correct. Share. Improve this answer. Purely functional programming plays extremely badly with multicore because it is so cache unfriendly. Cores end up contending for shared memory and parallel programs don't scale. Why are companies using or programs written in functional languages still so "rare"? Scala is often regarded as a functional language but it is no more functional than C# which is one of the most popular languages in the world today. Why, when looking at the advantages of functional programming, are we still using imperative programming languages? Purely functional programming has lots of serious disadvantages so we use impure functional languages like Lisp, Scheme, SML, OCaml, Scala and C#. Share. Functional programming owes its appearance to Alonzo Church, an American mathematician and logician. Back in 1920-s, he attended Princeton University where in 1924 he was awarded a Ph.D. in mathematics. An exceptional student, Alonzo was obsessed with abstract mathematical puzzles. What problems a machine with an infinite computational power would be able to solve? Thus functional programming was born "with no physical limitations that could restrain the scientist's imagination. Generally speaking, FP was intended to solve computational problems to make superpowerful machines work that yet didn't exist at that time (and are unlikely to appear even in the nearest future). Why functional programming is so great?