The States in Changes of State

Andrew Koontz-Garboden

Stanford University

1. States and the causative/inchoative alternation

The morphological typology of words denoting non-causative and causative COS predicates, as in (1a,b) respectively (i.e., the causative/inchoative alternation) has been relatively well studied in the typological literature. (Nedjalkov and Silnitsky 1973, Croft 1990, Haspelmath 1993).

(1) a. The vase broke. b. Kim broke the vase.

One of the main findings of this body of research is that there is no single direction of morphological derivation from causative to inchoative or inchoative to causative. Instead, words naming different kinds of events tend to show different directions of derivation (Croft 1990, Haspelmath 1993, Levin and Rappaport Hovav 1995). COS events that generally come about spontaneously, such as freezing events, for example, tend to be lexicalized as inchoatives, with the causative being derived, as shown for Swahili in (2).

(2) Swahili freezing events (Haspelmath 2005:5)

a. ganda (intransitive) b. gand-isha (transitive)

In contrast, events that tend not to come about spontaneously, such as events of breaking, are generally lexicalized as causatives, with the inchoative derived as shown again for Swahili by the data in (3).

(3) Swahili breaking events (Haspelmath 2005:5)

a. vunja (transitive) b. vunj-ika (intransitive)

1 Above all, I acknowledge the collaboration of the members of the community-based Ulwa Language Project, Karawala, RAAS. I am also indebted to Tom Green, Nubia Ordoñez, Guillermo Mclean, Melvin James Olegario, Elena Benedicto, and IPLC-URACCAN for facilitating my work with the Ulwa Language Project. BLS-32 audience members, Beth Levin, Peter Sells, Paul Kiparsky, Judith Tonhauser, Itamar Francez, Ashwini Deo, Philip Hofmeister, and John Beavers have all offered comments which have moved the work along. Financial support for the research reported here was provided in part by a Fulbright-Hays Dissertation Research Abroad Fellowship, Graduate Research Funds from the Department of Linguistics at Stanford University, and an NSF Small Grant for Exploratory Research (NSF Grant BCS-0004437, P.I. Beth Levin).
In what follows, I show that in addition to how the COS event is brought about (spontaneously or not), another factor that impacts the encoding of COS events is the nature of the state underlying the change of state. This is demonstrated primarily on the basis of data from Ulwa (Misumalpan), which show that COS events based on particular kinds of states (Dixon’s 1982 property concepts or adjectival states), are treated differently from other kinds of COS events (e.g., break-type COS events). Data from a number of other languages further suggest that it is not only in Ulwa that the nature of the state in a COS event has an impact on the encoding of the COS event. Instead, in a number of other unrelated languages, COS events based on adjectival states are, as in Ulwa, encoded differently from break-type COS events. This distinction has not been previously recognized—most discussions of the event structure of the causative/inchoative alternation make no distinction between deadjectival COS events and other COS events (Dowty 1979, Levin and Rappaport Hovav 1995, Piñon 2001) while some explicitly treat deadjectival and other types of COS events (e.g., break-type) on a par with one another (Parsons 1990, Baker 2003, Embick 2004). The findings suggest that COS events need to be distinguished on the basis of whether they are lexicalized as eventive eventualities (as with break-type eventualities) or whether the COS event is instead derived from the stative eventuality underlying the (derived) COS event, as in the case of change into adjectival state events.

I begin by discussing the privileged crosslinguistic status of adjectival states. I then examine deadjectival verbs and break-type verbs in the context of Ulwa verb class morphology. Next, I outline an analysis of the observed contrast in the encoding of COS events, proposing that it follows from differences in lexicalization. I then point toward data from other languages that suggest the highlighted contrast to be crosslinguistically robust.

2. Adjectival states as a privileged class of states

Two empirical observations suggest that adjectival states, the kinds of stative notions in (4) that Dixon (1982, 2004) refers to as property concepts, are a privileged class of stative predicates crosslinguistically.

(4) Dixon’s classes of adjectival states (Dixon 2004:3ff.)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Big, small, long, tall, short, wide, deep, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>New, young, old, etc.</td>
</tr>
<tr>
<td>Value</td>
<td>Good, bad, lovely, atrocious, perfect, etc.</td>
</tr>
<tr>
<td>Color</td>
<td>Black, white, red, etc.</td>
</tr>
<tr>
<td>Physical properties</td>
<td>Hard, soft, heavy, wet, rough, strong, etc.</td>
</tr>
<tr>
<td>Speed</td>
<td>Fast, quick, slow, etc.</td>
</tr>
<tr>
<td>Human propensity</td>
<td>Jealous, happy, kind, clever, generous, etc.</td>
</tr>
</tbody>
</table>

First, in a survey of languages with small inventories of adjectives, where many stative notions are instead lexicalized as nouns or verbs, Dixon (1982) found that no matter how small a class of adjectives a language has, if it has any adjectives at all, the class includes notions of dimension, age, value, and color. Crosslin-
guistically, as languages have progressively larger classes of adjectives, *physical property*, *speed*, and *human propensity* notions are also included in the class (see also Stassen 1997). Secondly, the names given to these stative eventualities are always morphologically simple, regardless of lexical category (Koontz-Garboden 2005, 2006a, Koontz-Garboden and Levin 2005). These facts suggest that adjectival states are a privileged lexical semantic class crosslinguistically. Given this observation, then, it might not be surprising to find that changes into these kinds of states are encoded differently from other types of COS events, in particular changes into states which are not in this privileged class.

3. Two classes of change of state verbs in Ulwa

Data from Ulwa, an endangered Misumalpan language spoken by approximately 350 people in the village of Karawala on Nicaragua’s Atlantic coast, confirm the suspicion that COS events based on adjectival states are treated differently from changes into states that are not in the core Dixonian class. I show this by contrasting the behavior of deadjectival verbs and *break*-type verbs, drawing on data from eleven months of my own fieldwork in 2004–2005 and from Green (1999).

I begin by laying out the facts of the Ulwa system of verb class suffixes. I then show that in this context, COS events based on different kinds of states receive different kinds of encoding. I follow this by an analysis which is built on the idea that change into adjectival state events are built on adjectival state roots, while *break*-type COS events are built on eventive roots.

3.1. Ulwa verb class suffixes

Ulwa verbs are divided into four major morphological classes according to the suffix that appears following the verbal root: –da–, –pa–, –wa–, and –ta–. The data in (5) illustrate verbs of each of these four classes, showing that while –da– and –wa– verbs are intransitive (5a,c), there exist both transitive (5b,d) and intransitive (5e,f) verbs in the –pa– and –ta– classes. (Infixes are glossed with <>.)

(5) a. As-ki-na ya andih birh-da-ida.
   shirt-<1SING> DEF already tear-DA-3SING,PAST
   ‘My shirt has already torn.’

   b. Asna ya birh-p-i yâ-t-ah.
   cloth DEF tear-PA-PROX 1SING.OBJ-TA-2SING,IMP
   ‘Tear the cloth and give it to me.’

   c. Arak-ki-bus bah-w-ida.
   gun-<1SING> break-WA-3SING,PAST
   ‘My gun broke.’

2Although Hale and Salamanca (2002) briefly acknowledge that there are not only transitive –pa/ta– verbs, but intransitive as well, their analysis is built around the idea that –pa– and –ta– are transitivizers, an idea that (5e,f) show cannot be correct. In fact, Green’s (1999) dictionary lists approximately one hundred –pa/ta– class intransitive verbs, many of whose intransitivity I have verified.
The generalization, then, captured by the table in (6) is that any verb that is transitive will be in the –ta/pa– class. For intransitive verbs, however, there are four possibilities for what class a meaning could fall into.

(6) An overview of the transitivity of Ulwa morphological verb classes

<table>
<thead>
<tr>
<th></th>
<th>intransitive</th>
<th>transitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>–da–</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>–wa–</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>–pa–</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>–ta–</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

3.2. The morphological classes of COS verbs in Ulwa

Data presented in the following two sections show that in the context of the Ulwa verb class system, change into adjectival state events are encoded differently from break-type COS events, which are not based on the Dixonian adjectival states.

3.2.1. Change into adjectival state verbs

COS verbs related to core adjectival states with few exceptions have intransitive verbs in either the –ta– or the –pa– class, as illustrated by the table in (7).

(7) Adjectives with associated intransitive COS verb

<table>
<thead>
<tr>
<th>adjective</th>
<th>gloss</th>
<th>Dixon class</th>
<th>intrans COS verb class</th>
</tr>
</thead>
<tbody>
<tr>
<td>aukha</td>
<td>fat</td>
<td>physical property</td>
<td>ta</td>
</tr>
<tr>
<td>babarka</td>
<td>thin</td>
<td>physical property</td>
<td>pa</td>
</tr>
<tr>
<td>sikka</td>
<td>big</td>
<td>dimension</td>
<td>wa</td>
</tr>
<tr>
<td>itukwana</td>
<td>big</td>
<td>dimension</td>
<td>wa</td>
</tr>
<tr>
<td>bisika</td>
<td>small</td>
<td>dimension</td>
<td>pa</td>
</tr>
<tr>
<td>tubakka</td>
<td>thick/dense</td>
<td>dimension</td>
<td>ta</td>
</tr>
<tr>
<td>siuka</td>
<td>grown/mature (fruit)</td>
<td>age</td>
<td>ta</td>
</tr>
<tr>
<td>yamka</td>
<td>good</td>
<td>value</td>
<td>pa</td>
</tr>
<tr>
<td>dutka</td>
<td>bad</td>
<td>value</td>
<td>ta</td>
</tr>
<tr>
<td>pauka</td>
<td>red</td>
<td>color</td>
<td>ta</td>
</tr>
<tr>
<td>pihka</td>
<td>white</td>
<td>color</td>
<td>ta</td>
</tr>
</tbody>
</table>
The first observation, revealed by the table in (7), is that deadjectival verbs always have adjectives based on the same roots. This may seem a tautologous observation for a class called “deadjectival”, but it is nevertheless important. As shown below, this is not necessarily the case for COS verbs based on non-adjectival states.

Next, some of these verbs participate in the causative/inchoative alternation, such as *auhnaka* ‘to become fat’ in (8). Noteworthy, however, is the fact that there is no change in verb class associated with the alternation—both the inchoative in (8a) and the causative in (8b) are in the –ta– class.

(8) *auhnaka* ‘to become fat’

   food thing-3SING much-ADJ eat-3SING.IRR if fat-ta-1SING.IRR
   ‘If I eat a lot I will become fat.’

b. Sū-ki-<1SING> auh-t-ikda.
   dog-<1SING> fat-ta-1SING.PAST
   ‘I fattened my dog up.’

Other change into adjectival state verbs fail to participate in the causative/inchoative alternation, lacking the causative variant, as illustrated for the verb *babarnaka* ‘to become thin’ in (9).

(9) *babarnaka* ‘to become thin’

a. Sūlu as watah yang katka babar-p-ida bahangh
   dog INDEF have 1SING but thin-pa-3SING.PAST so
   want-ta-1SING.NEG
   ‘I have a dog that has become thin, so I no longer want him/her.’

b. * Yang raupi sū-ki-<1SING> babar-p-ikda, kanas auhka dai
   1SING SUBJ dog-<1SING> thin-pa-1SING.PAST more fat-ADJ PAST.COP
   bahangh.
   so
   ‘I thinned my dog up because he was so fat.’

In summary, deadjectival verbs have adjectives based on the same roots, the verbs are in the –ta/pa– classes, and sometimes participate in the causative/inchoative alternation, though without a change in morphological class.

3.2.2. Break and cooking-type COS verbs

In contrast to what was just seen for deadjectival verbs which have intransitives in the –ta/pa– classes, intransitive verbs based on states that don’t fall into Dixon’s core class, exemplified by Levin’s (1993) break and cooking verbs, have intransitive
verbs that tend to be in the –da– or the –wa– classes, as shown for the infinitival forms of such verbs in (10) and (11).

(10) Infinitival forms of some intransitive break verbs

(11) Infinitival forms of some intransitive cooking verbs
lah-wa-naka ‘boil’, dâ-wa-naka ‘burn/bake’

Another point of contrast with deadjectival verbs is that the break-type and cooking type verbs consistently participate in the causative/inchoative alternation with a difference in the morphological class of the two variants, as illustrated for the verb bah(wa)naka ‘break’ in (12), where the the intransitive variant in (12a) is in the –wa– class with the transitive variant in (12b) in the –ta– class.

(12) a. Tulh-ki ya wauh-d-i bah-w-ida.
machete-1SING DEF fall-DA-SS break-WA-3SING.PAST
‘My machete fell and broke.’
b. Aaka baka-ka ul-niki pan-ka bah-t-ida.
this child-3SING write-1SING.INF stick-3SING break-TA-3SING.PAST
‘This child broke my pen/pencil.’

The break and cooking verbs also contrast with the deadjectival verbs in that adjectives based on the same roots as break-type and cooking verbs are generally not attested. For example, although there is a verb lahwanaka ‘boil’, there is no associated adjective *lahka with a meaning related to the verb based on the same root.

In summary, break-type verbs are built on roots that do not generally also form adjectives. Further, they consistently participate in the causative/inchoative alternation with a morphological difference between causative, which is in –ta/pa–, and inchoative, which is in –da/wa–. This contrasts with the situation for the deadjectival verbs, which have intransitives in the –pa/ta– classes. These observations lead to the question whether there is any difference between these morphological classes that might shed light on why deadjectival intransitives and break-type transitives are in the –pa/ta– classes while break-type intransitives are in the –da/wa– classes.

3.3. A bit more about Ulwa verb class morphology
It turns out that there is a difference in the extent to which –pa/ta– verbs and –da/wa– verbs consistently show their thematic markers in verbal paradigms. In infinitival paradigms, –pa/ta– verbs fail to show their thematic marker at all, as shown in (13a). Verbs in the –da/wa– classes, on the other hand, consistently show their verb class marker throughout the infinitival paradigm, as shown in (13b).
The States in Changes of State

(13) Infinitival paradigms

a. –pa– class sangnaka ‘to spoil; to cause to become green’
   1sing sang-niki 1pl.excl sang-nikina
       1pl.incl sang-nini
   2sing sang-nama 2pl sang-namana
   3sing sang-naka 3pl sang-nakana

b. –da– class birhdanaka ‘to become torn’
   1sing birh-da-niki 1pl.excl birh-da-nikina
       1pl.incl birh-da-nini
   2sing birh-da-nama 2pl birh-da-namana
   3sing birh-da-naka 3pl birh-da-nakana

Similarly, in finite paradigms, while –pa/-ta– class verbs fail to show their verb class marker in the first person inclusive and the third person plural, as shown in (14a), –da/wa– class verbs consistently show their verb class marker throughout the paradigm, as shown in (14b).

(14) Finite paradigms

a. –pa– themed sangnaka ‘to spoil; to cause to become green’
   1sing sang-pa-yang 1pl.excl sang-pa-yangna
       1pl.incl sang-wai
   2sing sang-pa-yam 2pl sang-pa-yamna
   3sing sang-pa-i 3pl sang-dai

b. –da– themed birhdanaka ‘to become torn’
   1sing birh-da-yang 1pl.excl birh-da-yangna
       1pl.incl yak birh-da-i
   2sing birh-da-yam 2pl birh-da-yamna
   3sing birh-da-i 3pl birh-da-dai

Thus, while –da/wa– class verbs consistently show their verb class marker throughout the paradigm, this is not so for –pa/-ta– class verbs, suggesting that these classes are fundamentally different from one another. Further, while –da/wa– verbs are consistently intransitive, –pa/-ta– verbs vary in transitivity. Assuming some treatment of the verb class markers as affixes (cf. Hale and Salamanca 2002), while –da/wa– suffixation is both found throughout the paradigm and has a consistent semantic outcome–intransitivity–neither is the case for –pa/-ta– suffixation, which neither appears throughout the paradigm nor has a consistent semantic outcome, there being both transitive and intransitive verbs in these classes. These facts suggest that while –da– and –wa– are derivational affixes operating on a root yielding some semantically altered stem with fixed intransitivity, –pa/-ta– are something else, possibly part of the person/number/finiteness inflectional morphology.

In the context of the encoding of COS events in Ulwa, then, the observation is that while intransitive verbs in the –da/wa– classes, including intransitive break-type verbs, are based on derived stems, intransitives in the –pa/-ta– classes, including intransitive deadjectival verbs, are not (see Koontz-Garboden 2006b for an additional argument to this effect).
3.4. Summary of the Ulwa facts
The table in (15) summarizes the facts of Ulwa discussed in the previous sections.

(15) Break versus deadjectival verbs in Ulwa

<table>
<thead>
<tr>
<th></th>
<th>adj</th>
<th>inchoative</th>
<th>causative</th>
</tr>
</thead>
<tbody>
<tr>
<td>deadjectival</td>
<td>yes</td>
<td>–pa/-ta– (underived)</td>
<td>–pa/-ta– (underived)</td>
</tr>
<tr>
<td>break</td>
<td>no</td>
<td>–da/-wa– (derived)</td>
<td>–pa/-ta– (underived)</td>
</tr>
</tbody>
</table>

First, while deadjectival intransitives are in the –pa/-ta– morphological verb classes, break-type intransitives are in the –da/-wa– classes. The difference between these morphological classes is such that deadjectival intransitives are underived while break-type intransitives are derived. Further, break-type transitives fall into the –pa/-ta– class, showing that in their underived form, they are causative. Next, break-type verbs consistently participate in the causative/inchoative alternation, with the intransitive variant in the derived –da/-wa– classes. Finally, there are adjectives based on the roots forming deadjectival verbs, while there are no adjectives based on the roots forming break verbs. In the following section, I suggest the outlines of an analysis of the lexical semantics of Ulwa roots and Ulwa derivational operations that captures these facts.

4. Toward an analysis
The core theoretical assumption that the analysis of the highlighted contrasts rests on is the Monotonicity Hypothesis (MH), the idea that word formation processes add, but do not delete meaning (Kiparsky 1982, Rappaport Hovav and Levin 1998, Koontz-Garboden 2005, 2006a, in prep.). Given this idea, the roots underlying deadjectival verbs must be stative—while change into adjectival state verbs can be derived from states monotonically, states cannot be so derived from changes of state; a derivation from change of state to state would necessarily involve the deletion of change semantics, inconsistent with the MH. The lexical semantics of the root underlying the deadjectival verb auhnaka ‘fatten’, then, would be as in (16a), where \( x \) ranges over ordinary individuals and \( s \) over stative eventualities. In contrast, roots underlying break-type verbs are causative and eventive, as in (16b), where \( e \) ranges over eventive eventualities, \( v \) ranges over eventualities more generally (whether stative or eventive), and \( \theta \) is an unspecified theta role, determined in part by the nature of the causing eventuality \( v \).

(16) a. denotation of the root auh– ‘fat’ = \( \lambda x \lambda s [fat(s,x)] \)

b. denotation of the root bah– ‘break’ = \( \lambda y \lambda x \lambda e [\exists v \exists s (\text{CAUSE}(v,e) \land \theta(v,x) \land \text{BECOME}(e,s) \land \text{THEME}(s,y) \land \neg \text{whole}(s))] \)

Given the lexical semantics in (16b), the MH predicts that there should not be adjectives based on these roots, since such a derivation would involve the deletion of causative and change of state semantics (i.e., to get from something like (16b) to something like (16a)). As discussed above, this prediction is borne out. Further, the treatment of the root as causative captures the fact that verbs based on such roots are causatives as underived –ta/-pa– class verbs. Concerning the intransitive –da/-wa–
variants of \textit{break}-type verbs, I treat the \textit{–da/wa–} suffixes as anticausativizers, with anticausativization semantically being a kind of reflexivization operation (Chierchia 2004). This is discussed in detail in Koontz-Garboden (in prep.), who further shows the reflexivization analysis to be consistent with the MH.

The core of the analysis rests on two simple ideas: the MH and a contrast in the lexicalization of roots. Change into adjectival state verbs are built on roots that are lexicalized as states, while \textit{break}-type COS verbs are built on roots that are lexicalized as (two argument) events. Given the contrast in lexicalization, many of the observed differences in behavior between the two classes follow from the MH.

5. **Supporting data from other languages**

In is not only in Ulwa that these kinds of contrast in behavior between deadjectival and \textit{break}-type verbs are observed. Indeed, across a number of other languages, deadjectival verbs are derived from morphologically simple state denoting words, while \textit{break}-type verbs are morphologically simple as COS events. Additionally, \textit{break}-type verbs lack corresponding simple adjectives (a fact suggesting they are not derived from the states underlying the COS events). To take one example, the data in (17) and (18) from Megerdoomian (2002) show this kind of contrast in Eastern Armenian. While \textit{–anal} derives a non-causative COS from an adjectival state and \textit{–ats–} a causative COS from this, there appear to be no simple adjectives associated with \textit{break}-type verbs. Instead, the morphologically simple form names a causative COS, with the non-causative COS being derived by an anticausative operation, marked with \textit{–v–}.

(17) **Eastern Armenian deadjectival verbs** (Megerdoomian 2002:98)

<table>
<thead>
<tr>
<th>adjective</th>
<th>non-causative COS</th>
<th>causative COS</th>
</tr>
</thead>
<tbody>
<tr>
<td>layn (wide)</td>
<td>layn.anal (widen)</td>
<td>layn.ats.nel (widen)</td>
</tr>
<tr>
<td>čor (dry)</td>
<td>čor.anal (dry)</td>
<td>čor.ats.nel (dry)</td>
</tr>
<tr>
<td>metz (big)</td>
<td>metz.anal (grow)</td>
<td>metz.ats.nel (grow, bring up)</td>
</tr>
<tr>
<td>arag (fast, quick)</td>
<td>arag.anal (quicken)</td>
<td>arag.ats.nel (accelerate)</td>
</tr>
<tr>
<td>čaq (fat)</td>
<td>čaq.anal (become fat)</td>
<td>čaq.ats.nel (fatten)</td>
</tr>
<tr>
<td>sev (black)</td>
<td>sev.anal (blacken)</td>
<td>sev.ats.nel (blacken, darken)</td>
</tr>
</tbody>
</table>

(18) **Eastern Armenian \textit{break}-type verbs** (Megerdoomian 2002:98)

<table>
<thead>
<tr>
<th>adjective</th>
<th>causative COS</th>
<th>non-causative COS</th>
</tr>
</thead>
<tbody>
<tr>
<td>k’ot’Rel (break)</td>
<td>k’ot’R.v.el (break)</td>
<td></td>
</tr>
<tr>
<td>epel (cook)</td>
<td>ep.v.el (cook)</td>
<td></td>
</tr>
<tr>
<td>poxel (change)</td>
<td>pox.v.el (change)</td>
<td></td>
</tr>
<tr>
<td>šarjel (move)</td>
<td>šarj.v.el (move)</td>
<td></td>
</tr>
<tr>
<td>xort’ak’el (sink, drown)</td>
<td>xort’ak’.v.el (sink, drown)</td>
<td></td>
</tr>
</tbody>
</table>

This suggests a crosslinguistic tendency for this kind of contrast in behavior between verbs with these kinds of meanings, a fact which I believe to be the results of (i) the nature of the semantics of word formation (constrained by the MH) and (ii) differences in lexicalization of roots (states versus COS events).

6. Concluding remarks

I have shown, largely on the basis of data from Ulwa, an endangered Misumalpan language that deadjectival verbs and break-type verbs differ from one another in fundamental ways. First, there are morphologically simple adjectives based on the roots underlying deadjectival verbs, while there are not for the roots underlying break-type verbs. Additionally, only break-type verbs consistently have causatives. Finally, intransitive break-type verbs and deadjectival verbs fall into different morphological verb classes, the former derived, the latter underived. This contrast, I believe, follows from both local differences in lexicalization and a more global constraint on the semantics of word formation (monotonicity). Regardless of analysis, however, the facts discussed clearly show that deadjectival and break-type verbs behave differently from one another, contra many analysis that treat them identically (e.g., Dowty 1979, Parsons 1990, Levin and Rappaport Hovav 1995, Piñón 2001, Baker 2003, Embick 2004). This area, then, is ripe for further theoretical exploration.

References


The States in Changes of State

1–49. Oxford: OUP.
Nedjalkov, V.P. and G.G. Silnitsky. 1973. The Typology of Morphological and


Department of Linguistics
Margaret Jacks Hall, Bldg. 460
Stanford University
Stanford, CA 94305-2150

andrewkg@csli.stanford.edu
http://www-csli.stanford.edu/~andrewkg/