Seneca Kinship: solution
http://gawron.sdsu.edu/semantics

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2 A solution with a subtle problem
3 The key idea
4 A solution
5 Problems with the solution
6 A logic-based solution
7 Summary of logic-based solution
Outline

1. Iroquoian kinship concepts
2. A solution with a subtle problem
3. The key idea
4. A solution
5. Problems with the solution
6. A logic-based solution
7. Summary of logic-based solution
<table>
<thead>
<tr>
<th>Relationship</th>
<th>Term</th>
<th>Kinship Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>father</td>
<td>haʔníh</td>
<td>F, FB, FMSs, FFBs, FMBs, FFSs, FFFBss, etc.</td>
</tr>
<tr>
<td>uncle</td>
<td>hakhnóʔsēh</td>
<td>MB, MMSs, MFBs, MMBs, MFSs, MMMSds, etc.</td>
</tr>
<tr>
<td>mother</td>
<td>noʔyēh</td>
<td>M, MS, MMSd, MFBd, MMBd, MFSd, MMMSdd, etc.</td>
</tr>
<tr>
<td>aunt</td>
<td>ake:haʔ</td>
<td>FS, FMSd, FFBd, FMBd, FFSd, FFFBsd, etc.</td>
</tr>
</tbody>
</table>
Iroquoian kinship concepts

A solution with a subtle problem

The key idea

A solution

Problems with the solution

A logic-based solution

Summary of logic-based solution
Consider a NEW feature **SIDE** with values **MOTHERS** and **FATHERS**.

<table>
<thead>
<tr>
<th>Side</th>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTHERS</td>
<td>Kinship types</td>
<td>whose first kinship link is M</td>
</tr>
<tr>
<td>FATHERS</td>
<td>Kinship types</td>
<td>whose first kinship link is F</td>
</tr>
<tr>
<td>SIDE MOTHERS</td>
<td></td>
<td>M, MF, MFd, MFFds, etc.</td>
</tr>
<tr>
<td>SIDE FATHERS</td>
<td></td>
<td>F, FM, FMd, FMFd, etc.</td>
</tr>
</tbody>
</table>
The feature $\text{SIDE}$ can be used to correctly describe $\text{GEN}^{-1}$ relatives in Seneca!

All haʔnih ("father") are male $\text{GEN}^{-1}$ relatives on the father’s side. All noʔyēh ("mother") are female $\text{GEN}^{-1}$ relatives on the mother's side. All “uncles” are male $\text{GEN}^{-1}$ relatives on the mother’s side. All “aunts” are female $\text{GEN}^{-1}$ relatives on the father’s side. So for example:

$$\lfloor \text{haʔnih} \rfloor = \lfloor \text{FATHERS} \rfloor \cap \lfloor \text{MALE} \rfloor \cap \lfloor \text{GEN}^{-1} \rfloor$$

This is an insight. But the feature $\text{SIDE}$ does not offer much help when it comes to $\text{GEN}^0$ relatives. A hatsiʔ ("elder brother") is a mixture of father’s side and mother’s side relatives. Can we do better?
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<table>
<thead>
<tr>
<th>Relationship</th>
<th>Title</th>
<th>Kinship Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father</td>
<td>ha?n̂ih</td>
<td>F, [FB], FMSs, FFBs, FMBs, FFSs, FFF-Bss, etc.</td>
</tr>
<tr>
<td>Uncle</td>
<td>hakhnóʔsēh</td>
<td>MB, MMSs, MFBs, MMBs, MFSs, MMMSds, etc.</td>
</tr>
<tr>
<td>Mother</td>
<td>noʔyēh</td>
<td>M, MS, [MMSd], MFBd, MMBd, MFSd, MMMSdd, etc.</td>
</tr>
<tr>
<td>Aunt</td>
<td>ake:haʔ</td>
<td>FS, FMSd, FFBd, FMBd, FFSd, FFFBsd, etc.</td>
</tr>
<tr>
<td>Elder Brother</td>
<td>hatsiʔ</td>
<td>B, MSs, [FB]s, [MMSd]s, FFBss, MFBds, FMSss, MMBds, etc. (older)</td>
</tr>
<tr>
<td>Cousin</td>
<td>akyáʔseʔ</td>
<td>MB(s/d), FS(s/d), MMSs(s/d), FFBd(s/d), MFBs(s/d), MFSd(s/d), MMBs(s/d)</td>
</tr>
</tbody>
</table>

Key observation:
haʔnih  my father  F, [FB], FMSs, FFBs, FMBs, FFSs, FFF-Bss, etc.

hakhnóʔsēh  my uncle  MB, MMSs, MFBs, MMBs, MFSs, MMMSds, etc.

noʔyēh  my mother  M, MS, [MMSd], MFBd, MMBd, MFSd, MMMSdd, etc.

ake:hak  my aunt  FS, FMSd, FFBd, FMBd, FFSd, FFFBsd, etc.

hatsiʔ  my elder brother  B, MSs, [FBs], [MMSd]s, FFBss, MFBds, FMSss, MMBds, etc. (older)

akyáʔseʔ  my cousin  MB(s/d), FS(s/d), MMSs(s/d), FFBd(s/d), MFBs(s/d), MFSd(s/d), MMBs(s/d)

Key observation: A “brother” is the child of a “father” or “mother”. A “cousin” is the child of a “uncle” or “aunt”.
Iroquoian cross/parallel: parenthood

Parallel sister/brother, father/mother: filled squares are same sex
Cross cousin, uncle/aunt: filled squares are opposite sex
hatsi?  my elder brother

akyāːʔseʔ?  my cousin

B, MSs, FBs, MMSds, FFBss, MFBds, FMSss, MMBds, etc. (older)

MB(s/d), FS(s/d), MMSs(s/d), FFBd(s/d), MFBs(s/d), FMSd(s/d), MMBs(s/d)
Iroquoian kinship concepts

A solution with a subtle problem

The key idea

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Summary of logic-based solution
\[ \text{GEN}^{-1} \text{ relatives} \]

<table>
<thead>
<tr>
<th>Relative</th>
<th>CP</th>
<th>PAR</th>
<th>SEX</th>
<th>GEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>noʔyěh mother</td>
<td>CP</td>
<td>PAR</td>
<td>FEMALE</td>
<td>-1</td>
</tr>
<tr>
<td>ake:hak aunt</td>
<td>CP</td>
<td>CROSS</td>
<td>FEMALE</td>
<td>-1</td>
</tr>
<tr>
<td>haʔnǐh father</td>
<td>CP</td>
<td>PAR</td>
<td>MALE</td>
<td>-1</td>
</tr>
<tr>
<td>hakhnóʔsēh uncle</td>
<td>CP</td>
<td>CROSS</td>
<td>MALE</td>
<td>-1</td>
</tr>
</tbody>
</table>
## $\text{GEN}^0$ Relatives

<table>
<thead>
<tr>
<th>Relative</th>
<th>CP</th>
<th>PAR</th>
<th>SEX</th>
<th>GEN</th>
<th>AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ahtsi?</td>
<td></td>
<td></td>
<td>FEMALE</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>eld. sister</td>
<td></td>
<td>PAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>akyãːʔseːʔ cousin</td>
<td></td>
<td>CROSS</td>
<td></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
GEN\(^{-1}\), GEN\(^0\) Feature definitions

**CP** CROSS : GEN\(^{-1}\) relative links in the kinship type are of the opposite sex; otherwise PAR

**SEX** Alter is Male/Female

**GEN** Number of generations up or down from Ego

**AGE** + means alter is older than ego; - means younger.
For male ego, "uncle" and "nephew" are converses

\[
\text{uncle}(x, y) \leftrightarrow \text{nephew}(y, x)
\]
In the case of *nephew* and *niece* the relatives that count for establishing an Iroquoian cross relationship are NOT in $\text{GEN}^{-1}$, but in $\text{GEN}^0$

- Sex of ego matters
### Crossed GEN<sup>1</sup> relatives

<table>
<thead>
<tr>
<th>Relation</th>
<th>CP0</th>
<th>SEX</th>
<th>ESEX</th>
<th>GEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>heyē:wō:tēʔ nephew (♂ego)</td>
<td>CROSS</td>
<td>MALE</td>
<td>MALE</td>
<td>1</td>
</tr>
<tr>
<td>kheyē:wō:tēʔ niece (♂ego)</td>
<td>CROSS</td>
<td>FEMALE</td>
<td>MALE</td>
<td>1</td>
</tr>
<tr>
<td>hehsōʔ?neh nephew (♀ego)</td>
<td>CROSS</td>
<td>MALE</td>
<td>FEMALE</td>
<td>1</td>
</tr>
<tr>
<td>khehsōʔ?neh niece (♀ego)</td>
<td>CROSS</td>
<td>FEMALE</td>
<td>FEMALE</td>
<td>1</td>
</tr>
</tbody>
</table>

Jean Mark Gawron (SDSU)

Gawron: Seneca Kinship

February 17, 2020
Parallel $\text{GEN}^1$ relatives

**khe:hawak daughter**

```
[ CP0  PAR  ]
[ SEX  FEMALE ]
[ GEN  1     ]
```

**he:hawak son**

```
[ CP0  PAR  ]
[ SEX  MALE ]
[ GEN  1     ]
```
### GEN$^{-1}$ Relatives: A second CP feat

- **noʔyēh (mother)**
  - CP: 1
  - PAR: 1
  - SEX: Female
  - GEN: 1

- **haʔnīh (father)**
  - CP: 1
  - PAR: 1
  - SEX: Male
  - GEN: 1

- **ake:hak (aunt)**
  - CP: 1
  - PAR: 1
  - SEX: Female
  - GEN: 1

- **hakhnóʔsēh (uncle)**
  - CP: 1
  - PAR: 1
  - SEX: Male
  - GEN: 1
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A key notational problem

Feature notation not ideal for relational facts

We need more than 1 feature representing the same underlying relationship. \( CP \) and \( CP0 \) check for identity of sex among relatives in the same generation, but because ego and alter are swapped, we need different features to do that.
**GEN\(^{-1}\) and GEN\(^1\)**

That these relations are converses is uncaptured.

<table>
<thead>
<tr>
<th>noʔyēh</th>
</tr>
</thead>
<tbody>
<tr>
<td>mother</td>
</tr>
<tr>
<td><img src="table1.png" alt="Table" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>haʔnih</th>
</tr>
</thead>
<tbody>
<tr>
<td>father</td>
</tr>
<tr>
<td><img src="table2.png" alt="Table" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>khe:hawak</th>
</tr>
</thead>
<tbody>
<tr>
<td>daughter</td>
</tr>
<tr>
<td><img src="table3.png" alt="Table" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>he:hawak</th>
</tr>
</thead>
<tbody>
<tr>
<td>son</td>
</tr>
<tr>
<td><img src="table4.png" alt="Table" /></td>
</tr>
</tbody>
</table>

**Entailments**

- female\(x\) & mother\((y, x)\) \(\rightarrow\) daughter\((x, y)\)
- male\(x\) & mother\((y, x)\) \(\rightarrow\) son\((x, y)\)
- female\(x\) & father\((y, x)\) \(\rightarrow\) daughter\((x, y)\) & male\(x\) & father\((y, x)\) \(\rightarrow\) son\((x, y)\)
Another view: Two distinct relations unnecessary

<table>
<thead>
<tr>
<th></th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>y is x’s mother</td>
<td>parent(y, x) &amp; female(y)</td>
</tr>
<tr>
<td>x is y’s daughter</td>
<td>parent(y, x) &amp; female(x)</td>
</tr>
<tr>
<td>y is x’s father</td>
<td>parent(y, x) &amp; male(y)</td>
</tr>
<tr>
<td>x is y’s son</td>
<td>parent(y, x) &amp; male(x)</td>
</tr>
</tbody>
</table>
Unifying the account

- **iparent** $x$ and $y$ stand in an *iparent* relation if they are consanguineal relatives who are exactly one generation apart.

- **iparent parent** $x$ is the *iparent parent* of $y$ if $x$ and $y$ stand in an iparent relation and $x$ is in the older generation.

- **iparent child** $x$ is the *iparent child* of $y$ if $x$ and $y$ stand in an iparent relation and $x$ is in the younger generation.

- **parallel iparent** $x$ and $y$ stand in a *parallel iparent* relation if $x$ and $y$ stand in an iparent relation and the parent of the iparent child is the same sex as the iparent parent.
The last step

$x$ and $y$ stand in a parallel iparent relation only if one is a parallel iparent of the other (one gen apart), so this handles both $\text{GEN}^{-1}$ and $\text{GEN}^1$ cases, but it doesn’t yet handle the $\text{GEN}^0$ case, where $x$ and $y$ are in the same generation.

**Generalized parallel iparent**

$ego$ and $alter$ stand in a **generalized parallel iparent** (GPP) relation if either $x$ and $y$ stand in a parallel iparent relation; or the parent of $ego$ is the iparent parent in a parallel iparent relation to $alter$.

\[
\begin{bmatrix}
\text{CP0} & \text{PAR} \\
\text{SEX} & \text{MALE} \\
\text{GEN} & 1
\end{bmatrix}
\Rightarrow
\begin{bmatrix}
\text{GPP} & \text{PAR} \\
\text{SEX} & \text{MALE} \\
\text{GEN} & 1
\end{bmatrix}
\]
Structural differences

True in Seneca and English
If A is B’s “brother”, then A is the “son” of B’s “father” or “mother”.

True only in English
If A is B’s “nephew”, then A is the son of B’s “sibling” (Seneca elder brother or younger brother or elder sister or younger sister).

heyẽ:wō:tẽʔ includes FSds (FSd is a cousin)
nephew (σ’ego)
Logical relationships are not being captured.

Symmetry
\[ \text{cousin}(x, y) \leftrightarrow \text{cousin}(y, x) \]

Converses
\[ \text{male}(x) \& \text{father}(y, x) \leftrightarrow \text{son}(x, y) \& \text{male}(y) \]
\[ \text{female}(x) \& \text{mother}(y, x) \leftrightarrow \text{daughter}(x, y) \& \text{female}(y) \]
\[ \text{male}(x) \& \text{uncle}(y, x) \leftrightarrow \text{nephewm}(x, y) \& \text{male}(y) \]
\[ \text{female}(x) \& \text{aunt}(y, x) \leftrightarrow \text{niecef}(x, y) \& \text{female}(y) \]

Entailment
\[ \text{female}(x) \& \text{father}(y, x) \leftrightarrow \text{daughter}(x, y) \& \text{male}(y) \]
\[ \text{male}(x) \& \text{mother}(y, x) \leftrightarrow \text{son}(x, y) \& \text{female}(y) \]
\[ \text{father}(z, x) \& \text{uncle}(z, y) \rightarrow \text{cousin}(x, y) \]
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Logical predicates

\[ \text{iparent}(x, y) \] is true of \( x \) and \( y \) when either \( x \) is \( y \)'s parent or \( x \) is a consanguineal relative of \( y \)'s parent, \( p \), in the same generation as \( p \), and has the same sex as \( p \).

\[ \text{inuncle}(x, y) \] is true of \( x \) and \( y \) when \( x \) is a consanguineal relative of \( y \)'s parent, \( p \), in the same generation as \( p \), and has the opposite sex from \( p \).

- **haʔnih (father)**
  \( x \) is my haʔnih if and only if \( \text{iparent}(x, me) \) and \( x \) is male.

- **he:hwak (son)**
  \( x \) is my he:hwak if and only if \( \text{iparent}(me, x) \) and \( x \) is male.

- **hatsiʔ (eld. brother)**
  \( x \) is my hatsiʔ if and only if I have a parent \( p \) such that \( \text{iparent}(p, x) \) and \( \text{male}(x) \) and \( \text{older-than}(x, me) \).
### Iparent/Ichild Axioms

<table>
<thead>
<tr>
<th></th>
<th>iparent</th>
<th></th>
<th>inuncle</th>
<th></th>
<th>isybling</th>
<th></th>
<th>icousin</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>$\text{parent}(p, c) \rightarrow \text{iparent}(p, c)$</td>
<td></td>
<td>(c)</td>
<td>$\text{iparent}(p, c) &amp; \text{sgr}(p, z) &amp; \sim \text{ss}(p, z) \rightarrow \text{inuncle}(p, z)$</td>
<td></td>
<td>(d)</td>
<td>$\text{iparent}(p, c_1) &amp; \text{parent}(p, c_2) \rightarrow \text{isybling}(c_1, c_2)$</td>
</tr>
</tbody>
</table>
**same-generation-relative Axioms**

**same-generation-relation**: a consanguineal relation in the same generation as ego

\[(a) \; \text{sybling}(x, y) \rightarrow \text{sgr}(x, y)\]
\[(b) \; \text{parent}(p_1, c_1) \& \text{parent}(p_2, c_2) \rightarrow [\; \text{sgr}(p_1, p_2) \leftrightarrow \text{sgr}(c_1, c_2) \;] \]
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No word for a key concept

The iparent relation is a parenting relation that holds between consanguineal relatives separated by one generation.

Notice that Seneca has no word for a same-sex-same-generation-relative, the crucial relation we used in our iparent axiom. Call this a member of ego’s cohort. A member of ego’s cohort might be either a cousin or a sibling. A sibling does not need to be of the same sex, but a member of one’s cohort does. It is interesting that the cohort concept seems to be crucial but there’s no word for it.

Maybe that’s because that concept plays no role in Seneca. It may be that when you or a member of your cohort has a child, a significant relation springs into existence, defining rights and obligations. It’s an iparenting relation.