

# General Relational Event Models

- `rem.dyad()` is excellent for dyadic data
- The relational event framework is more general than the dyadic case
  - i.e., egocentric events, multiple event types, multiple event histories
- The `relevent` package contains methods for estimating general relational event models:
  - `rem()` is the function for fitting general models

# General Relational Event Models

## Key Differences Between `rem()` and `rem.dyad()`

### `rem.dyad()`

- Data is list of sender-receiver dyads
- User-supplied 'order of events' (in ordinal case)
- Function-supplied sufficient statistics
- User-supplied N

### `rem()`

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# General Relational Event Models

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- **User-supplied sufficient statistics**

# General Relational Event Models

## User-Supplied Sufficient Statistics

Each element of  $g(y)$  needs to be constructed and supplied by the user. For each event-history, this will consist of an 3-D array called a statslist.

```
, , play
  play eat ran stay
1     1  0  0  0
2     1  0  0  0
3     1  0  0  0

, , eat
  play eat ran stay
1     0  1  0  0
2     0  1  0  0
3     0  1  0  0

, , stay
  play eat ran stay
1     0  0  0  1
2     0  0  0  1
3     0  0  0  1
```

- $i, j, k$  dimensions
- $i^{\text{th}}$  element is the order of the event
- $j^{\text{th}}$  element is the event type
- $k^{\text{th}}$  element is the model statistic

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# General Relational Event Models

## User-Supplied Sufficient Statistics

- Can be cumbersome to compute
  - Especially with many event types, actors, and complex sequence statistics
- Use the informR companion package to relevant
  - Version 1.0-4 as of this conference
  - Available on cran

# General Relational Event Models

## The informR package for R

- Aids in the construction of statslists for use by `rem()`
  - By automating the building and amending of complex arrays
- Methods for covariates on events and actors (limited)
- Appropriate for both ordinal and interval data
- Uses a simple event-type token system to specify statistics: “ab” for “event a → event b”

# General Relational Event Models

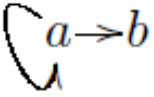
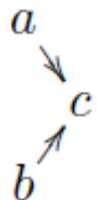
## A Note on Notation for informR Examples

- Sequence form (s-form for short) of model statistics
  - Let each s-form consist of two-parts
    - A prefix: The event or series of events that lead to a focal event to be predicted by the sufficient statistic.
    - A suffix: The event to be predicted by the sufficient statistic (preceded, of course, by the prefix).
  - $a \rightarrow b \rightarrow c$ , event sequence  $a \rightarrow b$  is the prefix, event  $c$  is the suffix
- See ?informR documentation for more details



# General Relational Event Models

## A Note on Notation for informR examples

S-form	Regex	Definition
$a \rightarrow a$	$aa$	inertial term: S-form of the type “event $a$ predicts event $a$ ”
$a \rightarrow b$	$ab$	basic digram transition term: S-form of the type “event $a$ predicts event $b$ ”
 $a \rightarrow b$	$a + b$	transition term with persistence: S-form of the type “some series of events $a$ predicts event $b$ ”
$a \rightarrow b \rightarrow c$	$abc$	basic trigram transition term: S-form of the type “event $a$ followed by event $b$ predicts event $c$ ”
	$(a b)c$	transition term with divergence: S-form of the type “event $a$ OR event $b$ predicts event $c$ ”

# General Relational Event Models

The informR package for R

Examples in R

# General Relational Event Models

## informR: Limitations and Future Functionality

### Limitations

- Number of event-types limited to 52 ( $26 \times 2$ )
- `glb.sformlist()` is slow when number of event-types  $\times$  number of statistics is large

### Upcoming Features

- Expected Fall 2013
- Arbitrary number of event-types
- Improved covariate routines
- Imputation of ``missing'' events (types and times)
- support list functions