

# The Friendship Field – Overview, Design concepts and Details

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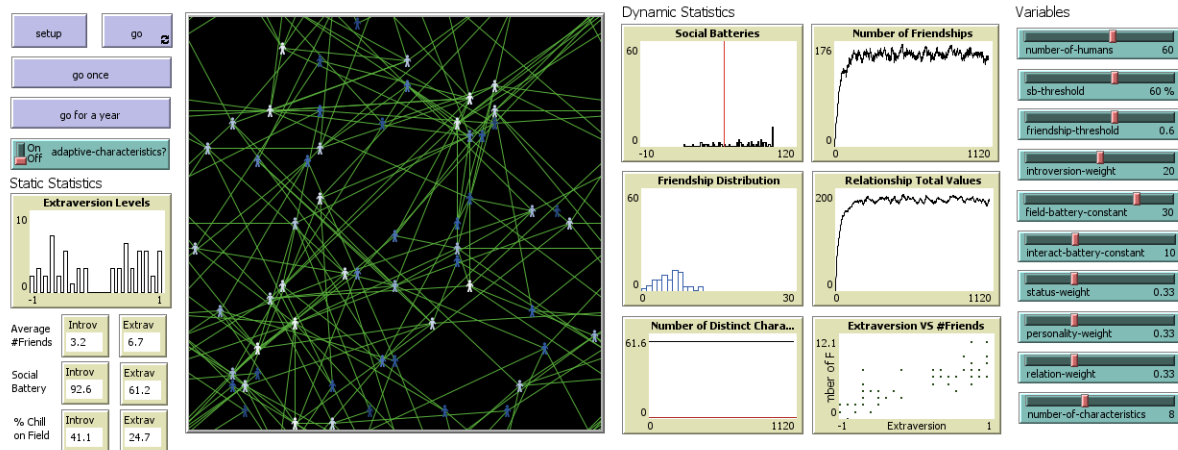


Figure 1. Interface of The Friendship Field

## Purpose

The purpose of this model is to determine how friendship networks evolve, based on status, extraversion and resemblance. We present the concept of social battery as a new factor in friendship formation.

## Entities, state variables & scales

### Agents

The agents in this model are humans. These humans have a fixed extraversion level, kindness, appeal and a list of binary characteristics. They also have adaptive status, social battery, candidate (for a mate), friends counter and current mate with whom they interact. Based on these interactions, the agents develop a certain relation and hence, the agents can form friendship networks.

Table 1. Overview of agent parameters

VARIABLE	USE	VALUE
EXTRAVERSION	Level of how extravert a human is	-1 to 1
STATUS	Amount of status a human has	0 to 1
KINDNESS	How easily they confer status to others	0 to 1
APPEAL	How easily they attract status from others	0 to 1
SOCIAL-BATTERY	How much social energy they have to form new friends/maintain friendships	0 to 100 (START = 100)
CHARACTERISTICS-LIST	List of binary characteristics in which they can resemble others	List of random 0s or 1s
CANDIDATE	Possible human to become mates with	Another human (START = nobody)
MATE	The human with whom they are interacting	Another human (START = nobody)
IS-AVAILABLE?	Whether the human is available to meet	TRUE or FALSE (START = TRUE)
FRIENDS-COUNTER	The number of friends a human has	0 to (number-of-humans – 1)

Table 2. Overview of global parameters

PARAMETER	USE	VALUE	DEFAULT
STATUS-WEIGHT	The importance of status in the status conferral	0-1	0.33
PERSONALITY-WEIGHT	The importance of personality in the status conferral	0-1	0.33
RELATION-WEIGHT	The importance of the relationship in the status conferral	0-1	0.33
VOLATILITY*	The importance of the conferral in status changing	0.1	0.1
SB-THRESHOLD	The percentage of social battery needed to interact for introverts	0-100	60
INTERACT-BATTERY-CONSTANT	The rate at which social interaction affects the social battery	0-30	10
FIELD-BATTERY-CONSTANT	The rate at which chilling on the field affects social battery	0-30	30
FRIENDSHIP-THRESHOLD	The value at which people are considered friends	0-1	0.6
INTROVERSION-WEIGHT	The importance of introversion to have the energy to socially interact	0-40	20
NUMBER-OF-CHARACTERISTICS	The number of characteristics the humans have	0-20	8
NUMBER-OF-HUMANS	The number of humans that are in the field	2-100	60
MIN-RELATION*	Minimal value for relation	0	0
MAX-RELATION*	Maximal value for relation	1	1
MIN-PROB*	Minimal raw probability for human to be chosen as candidate	0.1	0.1
MAX-PROB*	Maximal raw probability for human to be chosen as candidate	0.6	0.6
CHARS-WEIGHT*	Importance of the resemblance in interaction value	1.5	1.5
OPENNESS-WEIGHT*	Importance of the openness in the interact value	2	2
STATUS-CONF-WEIGHT*	Importance of the status conferral in the interaction value	1	1
ADAPTIVE-CHARACTERISTICS?	Boolean indicating whether characteristics can be adapted	True/False	False

## Environment & Network

The grid is a theoretical space in which humans can meet but it has no spatial meaning. The humans are able to confer status to each other and depending on their interaction, their mutual relationship can change. All the humans have a link to all the other humans and the humans function as nodes, their reciprocal relationship represented by the weight of that edge. Furthermore, the links all have a resemblance: the percentage of agreeing characteristics they possess. The links become visible when the relation value is higher than the friendship-threshold.

## Temporal Scale

A tick represents a moment, in which agents can either interact with each other or not. If they do not interact, they either exhaust or recharge their social battery.

## **Process overview & scheduling**

The pseudocode with initialization and execution (Figure 2).

```
;; Pseudo Code the Friendship Field
;; by Chrisja van de Kieft & Eva Timmer
;; Version 2.0.0

;; Initialisation
Create agents and distribute randomly on the Friendship Field
Form network between all agents

;; Execution
Each agent
    Calculates their wanting to meet another agent
    Sets their availability based on their wanting to meet
    If the agent is available:
        Pick a mate from all available agents
        If mate is available for interaction:
            Become each other's mate

    If agent has a mate:
        If the mate is already their friend:
            Interact with mate
        Else if the mate is not their friend yet:
            If the agent is extravert:
                Interact with mate
            Else if the agent is introvert:
                If agent has enough social battery to engage in meeting new people:
                    Interact with mate
                Else:
                    Chill on the Field
    Else if the agent doesn't have a mate:
        Chill on the Field
    Unmate
    Relationships decay
End

;; Interact with mate:
    Determine Status Conferral
    Interact
    Update Status
    Social Battery energy level changes with interaction
    Update Relationship

;; Chill on the Field:
    Social Battery energy level changes while chilling
```

*Figure 2. Pseudocode of the Friendship Field*

## ***Design concepts***

### *Basic principles*

The model is built using the Kemper's status-power theory. For the building of relationship, we added social battery since we believe this is important for social interaction (and thus friendship formation) and dependent on the extraversion. Also, the resemblance in characteristics between people is important for building relationships.

### *Emergence*

The model gives emergence to relations between people in terms of time and size. Furthermore, the model shows different patterns in for example number of friends when different settings are used. This can be used to study the differences between extraverts and introverts or status.

### *Adaptations*

The adaptive traits of the humans include their social battery exhaust/recharge and their status (and if switched on, their characteristics). The relation between agents adapts during interactions.

### *Objectives*

This model is designed to investigate the time and size of relationships between people and how they emerge based on extraversion, resemblance and status. The main objective of the model was to propose an implementation of the concept of a social battery.

### *Interaction*

The agents all have relationships with each other. These relationships are based on interactions between the agents. When agents are available for social interaction, they choose a candidate from the other available agents and when those agents also want a social interaction, the agents interact. The 'goodness' of the interaction depends on their social battery, extraversion, resemblance and status conferral.

### *Stochasticity*

The order in which the agents meet a mate is randomly generated every run. This causes the agents to have a different probability of meeting someone else every run.

### *Collectives*

There are no collectives in this model, since group formation is not included. The agents act as individuals. Group formation could be an extension for this model.

### *Observation*

We observe the network of relations and their strengths over time, thus we look at the number of friendship formed.

## Submodels & Procedures

Table 3. Overview of procedures in a tick (combined by GO). Procedures not included are the Set Up procedures and the procedures needed for Plotting.

PROCEDURES	DESCRIPTION	VARIABLES
<b>MATES-INTERACT</b>	The mates interact and update their relation, status and social battery (determine-conferral, interact, update-relationship, update-status, interact-social-battery)	[calls other procedures]
<b>MEET</b>	The agent picks another agent and checks their availability. If the agent is available (has no mate), they become each other's mates.	Own and mate's is-available? Own and mate's mate own candidate
<b>CALCULATE-WANTING</b>	Calculates the wanting to meet to get to the TRUE/FALSE probabilities for the is-available?	Social-battery Sb-threshold Extraversion
<b>DETERMINE-CONFERRAL</b>	The agent calculates the status conferral	own kindness mate's appeal mate's status Status-weight Personality-weight Relation-weight relation
<b>INTERACT</b>	The agent interacts with mate and define their corresponding characteristics, regard its own extraversion and considers the status conferral. This results in an interaction-value for how 'well' the interaction is perceived by the agent.	Own Extraversion Status-conferral Own and mate's characteristics-list relation
<b>UPDATE-STATUS</b>	The mate's status updates by comparing the status-conferral to the mate's status	mate's status Status-conferral volatility
<b>BOUND-SOCIAL-BATTERY</b>	Bounds the social battery to be within the boundaries of 0 and 100	Social-battery
<b>INTERACT-SOCIAL-BATTERY</b>	The social battery of the agent is changed due to the social interaction	Social-battery Extraversion
<b>UPDATE-RELATIONSHIP</b>	The relation between the agents updates	Relation interaction-value
<b>UN-MATE</b>	The agent ends their interaction and the links with a relation above the friendship-threshold become visible	Mate Relation Friendship-threshold
<b>FIELD-SOCIAL-BATTERY</b>	The social battery of the agent is changed due to chilling on the field	Social-battery Extraversion
<b>DECAY-RELATIONS</b>	Relation decay at the end of each tick, based on how good the relation is	relation
<b>COUNT-FRIENDS</b>	Counts the number of friends an agent has	Friends-counter Relation Friendship-threshold

## Flowchart

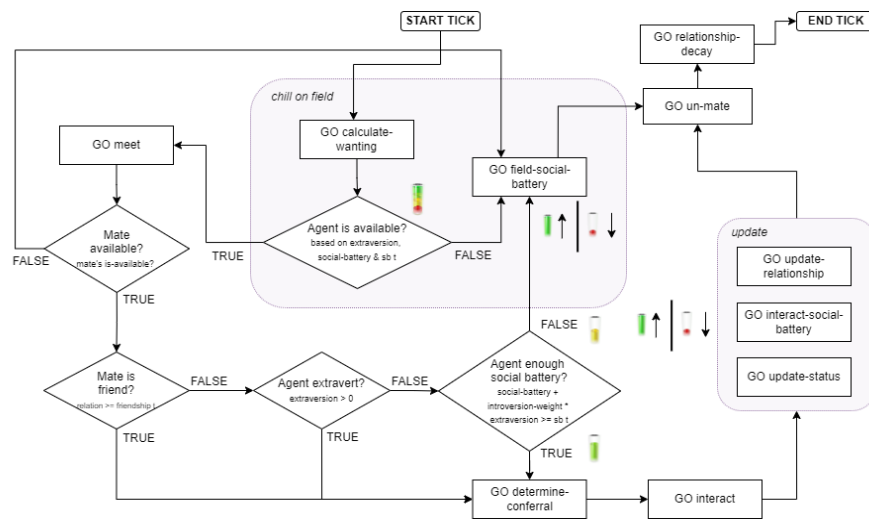


Figure 3. Flowchart of the Friendship Field