How do Personality & Mood affect Social Interaction

Using Sociometric Badge Data to understand Social Behaviour

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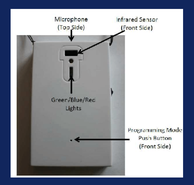
1. The Data

What? -

- Data on how 52 employees in an Italian research institution **interact** with one other on a **daily basis**
- Daily data on their current **Personality** and **Mood**



How? -

- **Sociometric Badges** with inbuilt sensors which **logged interaction** between participants
- **Surveys** administered **3x a day** by mail, measuring Personality and Mood of respondents

2. Objectives

To analyse the influence of a person's **Traits** (Personality and Mood) on their **Interaction** (Social Behaviour)

Two Critical Success Factors -

I. **Modelling** Trait-Interaction relationships
- i.e. measuring Traits' influence on Interaction

II. Deriving reasonable **conclusions** from the models' insights

3. Methodology

I. **Data Understanding** - Dataset contains **two types** of variables for each participant for each day -
- **Social Interaction** (how many times and with whom the participant interacted with that day)
- **Personality/Mood** (measured daily using modified Big 5 & and PANAS frameworks)

II. **Data Preparation** - Data had to be transformed using Pivot Tables to be made ready for Rapidminer. An additional variable - Avg. Interactions per Person - had to be calculated.

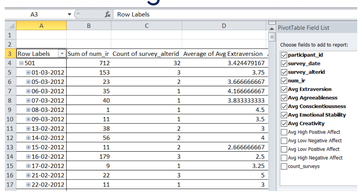
III. **Analysis** - Two Interpretable Models - Decision Tree and Multiple Linear Regression - were used. Only interpretable models were applicable to this study as only such models can provide us with insights into the relationships between Traits and Interactions

IV. **Evaluation** - The relationships provided by the models were used to derive insights into how a person's Traits might effect a their social behaviour

4 Analysis - Phase 1: Data Prep & Modelling

Step 1

Data Processing & Feature Extraction



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05-03-2012	23	2	3.666666667
06-03-2012	35	1	4.166666667
07-03-2012	40	1	3.833333333
08-03-2012	1	1	4.5
09-03-2012	11	1	3.5
13-02-2012	38	2	3
14-02-2012	56	2	4
15-02-2012	11	2	2.666666667
16-02-2012	179	3	2.5
17-02-2012	9	1	3.25
21-02-2012	22	3	5
22-02-2012	11	1	3

- A **Pivot Table** was created to compile all necessary information in a single excel table easily readable by Rapidminer. The variables were ordered by Individual, then by Date of Interaction. The following variables were added:

- **Social Interaction measures -** Daily Interaction, Daily No. of People interacted with, Avg. Interactions per person
- **Personality/Mood Measures** - 5 Personality & 4 Mood Indicators mentioned in Section 3

- These observations were exported to a separate Excel Workbook and imported into Rapidminer

Step 2

Creating the Rapidminer Workflow

The Rapidminer Workflow:

1. Import the Dataset from Step 1
2. Select the Label (Dependent Variable) and Attributes (Independent Variables) using operators based on what relationship is being analysed
3. Split Data into a 80/20 Train/Test split
4. Train Linear Regression & Decision Tree Models
5. Apply both models with Testing set
6. Run the Workflow to generate the Models

5. Results & Insights

(+ = Most Positively Correlated, - = Most Negatively Correlated)

1. Total Daily Interactions
   - +vely - **Agreeableness & Low HPA**
   - -vely -**Extroversion & High HPA**
2. No. of People Interacted w/ Daily
   - +vely - **Extroversion & Low LPA**
   - -vely - **Creativity & High LPA**
3. Avg. Interactions per Person
   - +vely - **Creativity & High LPA**
   - -vely - **Extroversion & High HPA**

A few Insights from the Analysis

- People w/ **High Extroversion** actually have **less** number of social interaction, but they interact with a wider variety of people than others.
  - They prefer **variety** of interactions over **quantity**
- People with a more **positive mood** & people feeling **Creative** interact with **fewer people**, but interact **more often** with those few people
  - They prefer to stick with a **limited** social group
  - This may indicate that **depth** of social interaction is a better **aide to creativity** than variety.
- In general, the **less positive** one's mood, the **greater** the **quantity** and **diversity** of social interaction.
  - People may be using to social interaction as a treatment for a "foul mood".

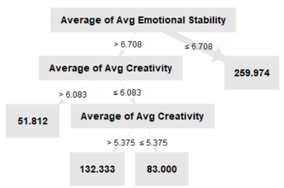
(Many more such insights can be derived from this analysis)

4 Analysis - Phase 2: Measuring Influence of Variables

Step 3 - Personality's Influence on Interaction

1. **Impact on Total Daily Interactions**

Attribute	Co-Efficient
Avg Agreeableness	6.33
Avg Emotional Stability	4.47
Avg Creativity	-5.04
Avg Conscientiousness	-20.08
Avg Extraversion	-20.80

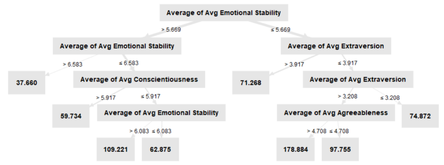


2. **Impact on No. of People Interacted w/ Daily**

Attribute	Co-Efficient
Avg Extraversion	0.20
Avg Emotional Stability	0.16
Avg Conscientiousness	0.01
Avg Agreeableness	-0.09
Avg Creativity	-0.22

3. **Impact on Avg. Interactions per Person**

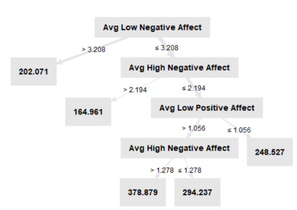
Attribute	Co-Efficient
Avg Creativity	9.53
Avg Agreeableness	6.35
Avg Emotional Stability	-3.51
Avg Conscientiousness	-12.84
Avg Extraversion	-13.95



Step 4- Mood's Influence on Interaction

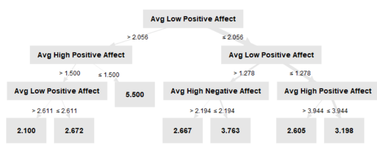
1. **Impact on Total Daily Interactions**

Attribute	Co-Efficient
Avg High Negative Affect	-14.53
Avg Low Positive Affect	-14.66
Avg Low Negative Affect	-25.48
Avg High Positive Affect	-39.16



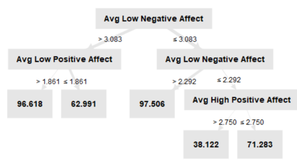
2. **Impact on No. of People Interacted w/ Daily**

Attribute	Co-Efficient
Avg High Positive Affect	-0.02
Avg Low Negative Affect	-0.12
Avg High Negative Affect	-0.13
Avg Low Positive Affect	-0.19



3. **Impact on Avg. Interactions per Person**

Attribute	Co-Efficient
Avg Low Positive Affect	8.35
Avg High Negative Affect	-4.43
Avg Low Negative Affect	-6.09
Avg High Positive Affect	-6.89



Left: The Co-Efficients of the Multiple Linear Regression model. Used to identify the influence of Each Factor
Right: The Decision Trees (max depth of 5). Used to demonstrate the most important Factors.