Emotional Intelligence evaluation in Greek Adolescents and Young Adults: A Data Mining Approach

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Introduction

In this paper Machine Learning and Data Mining methods were applied so as to discover patterns and associations among characteristics of Emotional Intelligence (EI) in a group of Greek Adolescents and Young Adults 13-24 years old. Emotional Intelligence can be defined as the ability to monitor one's own and other people's emotions, to discriminate between different emotions, label them appropriately and to use emotional information to guide thinking and behavior.

Trait Emotional Intelligence

For recording, tracing and evaluation of the EI, the standardized scale Trait Emotional Intelligence (TEIQue) which proposed by K.V. Petrides, was utilized. Trait EI is "*a constellation of emotional self-perceptions located at the lower levels of personality*". In lay terms, trait EI refers to an individual's self-perceptions of their emotional abilities.

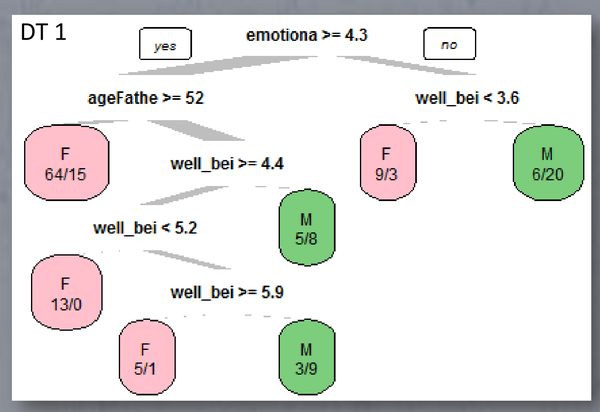
The **TEIQue** provides an operationalization for the model of Petrides and colleagues that conceptualizes EI in terms of personality. The test encompasses 15 subscales organized under four factors:

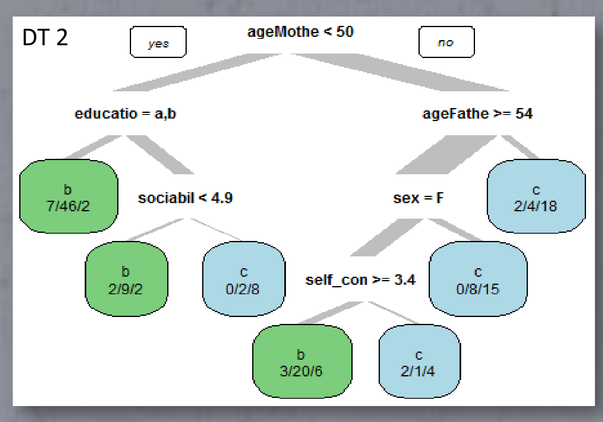
- **Well-being**: Self-esteem-Successful and self-confident, Trait happiness-Cheerful and satisfied with their lives, Trait optimism-Confident and likely to "look on the bright side" of life.
- **Self-control**: Emotion regulation-Capable of controlling their emotions, Stress management-Capable of withstanding pressure and regulating stress, Impulsiveness (low)-Reflective and less likely to give in to their urges.
- **Emotionality**: Emotion perception (self and others)-Clear about their own and other people's feelings, Emotion expression-Capable of communicating their feelings to others, Relationship skills-Capable of having fulfilling personal relationships, Empathy-Capable of taking someone else's perspective.
- **Sociability**: Social competence-Accomplished networkers with excellent social skills, Emotion management (others)-Capable of influencing other people's feelings, Assertiveness-Forthright, frank, and willing to stand up for their rights.

Methodology

1. **Design** and **creation** of the electronic questionnaires and posted through the website http://www.cicos.gr.
2. **Collection** of the questionnaires and **preprocessing** the answers, in order to transform them in an appropriate format (raw data) for analysis.
3. **Exploration** of the dataset using tools from the field of Descriptive Statistics.
4. **Data Mining Analysis** of the dataset so as to extract useful, hidden knowledge, in the form of patterns, rules and clusters.
5. **Interpret** and **evaluate** the knowledge.

Classification Rules based on Decision Trees





- Female adolescents having age father greater than 52 years old, exhibit higher level of emotionality (>=4.3) than males, with probability around 0.81 (64/79) [DT 1]
- The aforementioned rule is enhanced when the level of well-being scale is greater than 4.4. On the other hand, males adolescents indicate low level of well-being (<4.4) [DT 1]
- Contrariwise, males adolescents reveal emotionality lower than 4.3 and well-being level greater than 3.6 comparing with females [DT 1]
- Adolescents whose parents have the same education level (tertiary) exhibit lower sociability level (< 4.9) than others whose parents' education level differ [DT 2]
- Female adolescents whose mothers have tertiary education (c) indicate lower self-control comparing with females whose mothers have secondary education [DT 2]

Sample

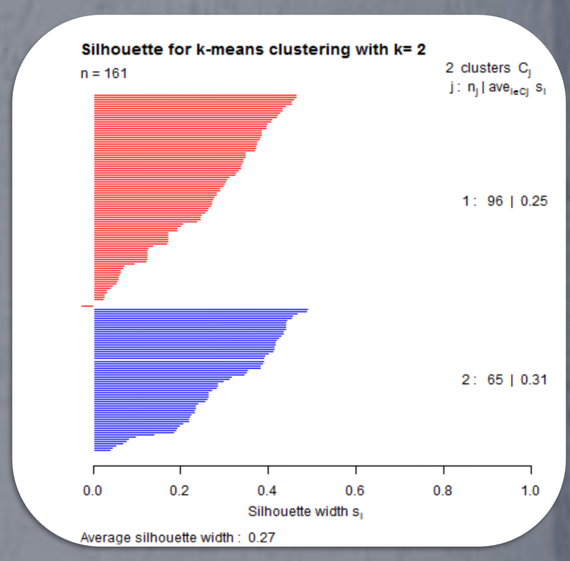
- A total of 161 (65.2% female, 34.8% male) Greek Adolescents and Young Adults 13-24 years old were recruited.
- The majority of respondents (≈ 69%) were born in urban areas, most of them are females (≈ 61,2%).
- As regarding the education level of the parents of the respondents, the majority of them (≈ 45% for fathers, ≈ 56% for mothers) is in secondary level. Moreover around 35.4% of fathers has taken tertiary education against 34% of mothers.

Data Mining Approach

- **Classification**: the goal is to describe the hidden patterns underlying in the data creating Decision Trees, which are a powerful way in order to present and facilitate statements analysis (psychological) principally, comprising successive decisions and variable results in a designated period.
- **Clustering**: the aim is to extract previously unknown knowledge, grouping respondents into clusters with common demographic and psychological characteristics. In this study, a well-known clustering algorithm is applied, named k-means. The clustering is evaluated using the Silhouette validity measure.
- The Data Mining analysis of the dataset is conducted using the **R-project**, which is an open source software.

Clustering Results

- The 161 instances are grouped into k=2 clusters, with total Silhouette value 0.27
- First cluster consists of 96 adolescents having average sociability 4.54, emotionality 4.57, well-being 3.96 and self-control 3.67
- Second cluster consists of 65 adolescents having average sociability 5.13, emotionality 5.27, well-being 5.42 and self-control 4.8
- 68.75% of adolescents in the first cluster are females and the remaining 31.25% are males. In the second cluster the gender distribution is 60% females and 40% males



Conclusions

The results indicate among others, that the use of Data Mining methods is an important tool to export and receive the conclusions and decisions especially in the field of psychological assessment and in adolescent psychology and psychiatry.

References

- Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "*Introduction to Data Mining*", Addison-Wesley, 2006.
- Petrides, K. V. & Furnham, A., "*The role of trait emotional intelligence in a gender-specific model of organizational variables*", Journal of Applied Social Psychology, vol. 36, pp. 52-569, 2006.
- Petrides, K.V.; Furnham, A., "*Trait emotional intelligence: behavioral validation in two studies of emotion recognition and reactivity to mood induction*", European Journal of Personality, vol. 17, pp. 39–75, 2003.

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