

Personality and Social Context: Impact on Emotion Induction from Movies

Ante Odić¹, Marko Tkalčič², Jurij F. Tasič¹, and Andrej Košir¹

¹ University of Ljubljana, Faculty of Electrical Engineering, Tržaška cesta 25,
Ljubljana, Slovenia,

`ante.odic@ldos.fe.uni-lj.si`,

² Johannes Kepler University Department for Computational
Perception, Linz, Austria, Altenberger Str. 69, Linz Austria

Abstract. In this paper we describe our preliminary work on understanding the impact of personality on the emotion induction in different social circumstances during the consumption of movies, for the purpose of the context-aware recommender system for movies. The purpose of this study is to answer two research questions: is there a difference in emotion induction when users are alone as opposed to when they are with company during watching the movie, and do different personality profiles influence the emotion induction when users are alone as opposed to when they are with company during watching the movie? We have used the (LDOS-CoMoDa) dataset which contains ratings and associated contextual information for the consumed movies, as well as Big Five personality profiles of the users. The results showed that there is an influence of social context on emotion induction, and that personality factors have to be taken into consideration since for the different groups of users, based on the personality factors, the emotion induction was influenced differently.

Keywords: context-aware, recommender systems, user modeling, personality

1 Introduction

Employing contextual information in personalized services, such as recommender systems (RS), has been a popular research topic over the past decade. Contextual information is defined as information that can be used to describe the situation and the environment of the entities involved in such systems [3], and was proved to improve the recommendation procedure in context-aware recommender systems (CARS) [1, 2, 9], as well as other personalized services [12]. In our previous work [8] we showed that emotional context is relevant and by employing it we were able to significantly improve the quality of rating prediction in RS. In addition, the authors in [10, 11], have successfully used personality and emotions in RS for images.

In this paper we describe our preliminary work on understanding the impact of personality on emotion induction in different social circumstances, during the consumption of movies, for the purpose of CARS for movies.

1.1 Motivation and Goal

According to [13], personality refers to the enduring patterns of thought, feeling, motivation and behavior that are expressed in different circumstances. The authors in [7] state that the Big Five factor model of personality is a hierarchical organization of personality traits in terms of five basic dimensions: extraversion, agreeableness, conscientiousness, neuroticism and openness to experiences. The description of the five factors and their sub factors was provided in [5]. According to [14] all five factors influence feelings and emotional behavior.

Since we have shown the importance of emotion context in our previous work [8], we were interested in inspecting the impact of different users' personality profiles on the emotion induction. In addition, in the same study we have observed that the social context was not relevant and did not improve the rating prediction by our models. Nevertheless, we were still interested in the impact of the social context on the emotion induction. If the social context does impact the emotion induction and consequently the emotion context, such information could still be valuable for modeling users' behavior.

Therefore, the purpose of this study is to answer the following research questions: (i) Is there a difference in emotion induction when users are alone as opposed to when they are with company while watching movies? (ii) Do different personality profiles influence the emotion induction when users are alone as opposed to when they are with company while watching movies?

2 Materials and Methods

In this section we describe the dataset and the methods used in this study.

2.1 Dataset

For the purposes of this work we have used the *Context Movie Dataset* (LDOS-CoMoDa), that we have acquired in our previous work [8].

We have created an online application for rating movies which users are using in order to track the movies they watched and obtain the recommendations (www.ldos.si/recommender.html). Users are instructed to log into the system after watching a movie, enter a rating for a movie and fill in a simple questionnaire created to explicitly acquire the contextual information describing the situation during the consumption. In addition, we have asked our users to complete the standardized Big-Five questionnaire to acquire their personality profiles for research purposes. The Big Five questionnaire used consisted of 50 questions answered by selecting an answer from the five point Likert scale. As a result, for each user that had completed a questionnaire, we have obtained scores for five personality factors *extraversion*, *agreeableness*, *conscientiousness*, *neuroticism* and *openness to experiences*.

We have collected 2296 ratings from 121 users to 1232 items with associated contextual variables. Big Five profiles were collected from 78 users that were willing to participate. Additional information about our *Context Movies Database* (LDOS-CoMoDa) can be found in [6] and [8].

2.2 Preparing Data

In order to use the LDOS-CoMoDa dataset for this study we had to process the acquired rating data with associated contextual information.

First of all, we filtered out all the entries in the dataset from those users from which we have not acquired personality profile. As a result there were 1708 entries from 78 users left in the dataset.

Social context in LDOS-CoMoDa dataset is described by a categorical variable with categories: *alone*, *partner*, *friends*, *colleagues*, *parents*, *family* and *general public*. In this study we were interested in observing the differences in emotion induction when the user is alone from when the user is with company. Therefore, we regrouped the categories of the social contextual variable to only two categories: *alone* and *not alone*.

Emotional state context in the dataset is described by two categorical variables: *dominant emotional state experienced the most during watching a movie*, and *emotional state at the end of the movie*. Both variables have following categories: *sad*, *happy*, *fear*, *disgust*, *surprise*, *angry* and *neutral*. We have decided to observe the dominant emotional state experienced the most during watching the movie. Furthermore, since we were interested in observing the induction of emotions we have regrouped the categories in the following way: in the case of *sad*, *happy*, *fear*, *disgust*, *surprise* or *angry* we assume that there was an induced emotion, in the case of *neutral* we assume there was no (or at least much less) emotion induction during the consumption of a movie. Therefore we regroup the categories of the variable into two categories: *emotion* and *no emotion*.

Each personality factor holds a score from zero to 100. For example, for the *extraversion* factor a user with a score of 100 would be considered highly extroverted, while a user with a score of zero would be considered highly introverted. For each personality factor we have set a threshold at a score of 50 and have grouped users into two groups *high* (if the user's score is higher than or equal to 50) and *low* (if the user's score is lower than 50). For example, for extraversion we thus have two groups *high extraversion* and *low extraversion*. Consequently we have compared emotion induction between users that have scored high and low in each personality factor which resulted in ten "personality groups": *high extraversion*, *low extraversion*, *high agreeableness*, *low agreeableness*, etc. Note that we have observed the induction of emotions for each personality factor separately and leave the combinations of factors for future work.

2.3 Observing and Testing the Difference in Emotion Induction

For each personality group separately we have compiled contingency tables which show the interrelation between contextual variable describing the social state and contextual variable describing the dominant emotion during the movie consumption. Such table contains the numbers of occurrences of emotion induction in two different circumstances: user was alone and user was not alone. Table 1 shows an example of contingency table for the *agreeableness* groups.

Table 1. Contingency table example for *low agreeableness* and *high agreeableness* personality groups.

	Low agreeableness		High agreeableness	
	Alone	Company	Alone	Company
No emotion	30	89	244	230
Emotion	77	117	421	500

From the contingency tables, for each personality group, we have calculated the proportion of emotion induction in different social circumstances: when users were alone and when users were not alone. To test if the difference in the proportions is statistically significant we have used the z-test for proportions with significance level of 0.05.

3 Results

Results showed us that for *conscientiousness* and *neuroticism* there were no significant differences in any case, therefore, we leave the detailed results for those personality factors out of this paper.

First, from the contingency tables, we observed the difference in average proportion of emotion induction between *low* and *high* groups for personality groups. These are the average proportions of emotion occurrences, regardless of the social circumstances. Figure 1 shows the difference in proportion of emotion induction between *low* and *high* groups.

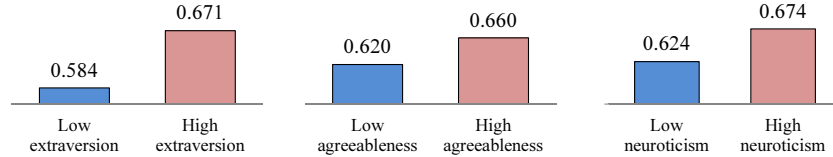


Fig. 1. Average proportion of emotion for personality groups.

Next we observed the difference in emotion induction proportion in different social circumstances. Figure 2 shows the proportions for low- and high- extraversion personality groups. Figure 3 shows the proportions for low- and high- agreeableness personality groups. Figure 4 shows the proportions for low- and high- neuroticism personality groups. Note that the low and high charts do not share the x-axis. Axes are scaled to best show the pattern of opposite impact of high and low groups on the emotion induction. Values of proportions are correctly stated at the top of the bars on the charts.

Results of the z-test for the statistical significance of the difference in proportions between social circumstances are shown in Table 2. In the personal-

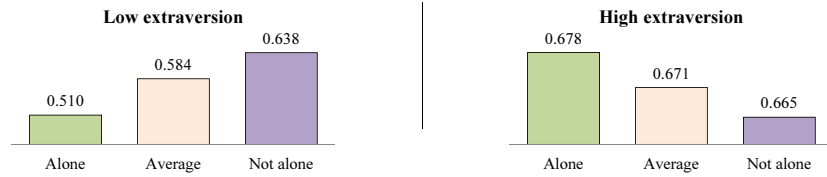


Fig. 2. Proportions of induced emotion in users when alone, on average and when not alone for the low and high extraversion groups.

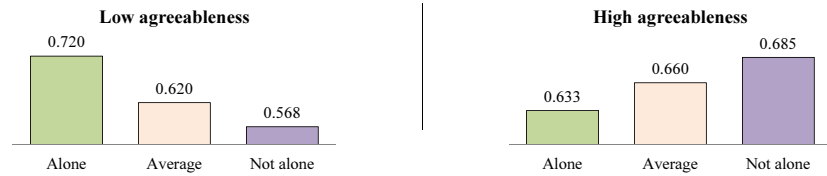


Fig. 3. Proportions of induced emotion in users when alone, on average and when not alone for the low and high agreeableness groups.

ity group column, groups for which the difference is statistically significant are marked with bold characters.

Table 2. Statistical significance results from the z-test for proportions for different personality groups (alone vs. not alone).

personality group	p-value (alone vs. not alone)
Low extroversion	0.015
High extroversion	0.623
Low agreeableness	0.009
High agreeableness	0.041
Low neuroticism	0.031
High neuroticism	0.366

4 Discussion

As it can be seen on Figure 1, the highest 8.9% difference in the average proportions between high and low groups are for the extraversion factor. For the agreeableness factor the difference is 4%, and for the neuroticism 5%. For each factor the *high* group had higher proportion of emotion induction than the *low* group.

Figures 2, 3 and 4 show an interesting pattern for extraversion, agreeableness and neuroticism factors. For each factor, users from the *low* group experienced emotion induction exactly in the opposite way that the users from the *high* group. For example, for the agreeableness factor, users with low agreeableness that consumed movies alone experienced emotions on more occasions than

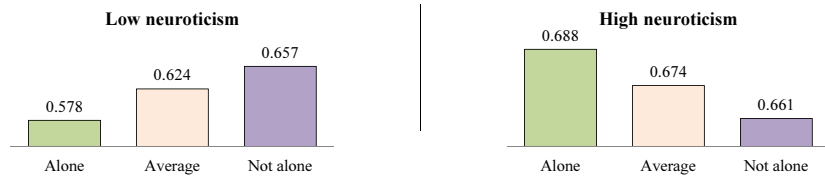


Fig. 4. Proportions of induced emotion in users when alone, on average and when not alone for the low and high neuroticism groups.

group’s average, but on fewer occasions than group’s average when not alone. The opposite effect was observed for the users from the high agreeableness group, who experienced emotions less when alone than when with the company of others.

Table 2 shows that in the case of the low extroversion, low agreeableness, high agreeableness and low neuroticism the difference in the proportions of the emotion induction in different social circumstances was statistically significant.

These results show that there is an influence of social context on emotion induction, however personality factors have to be taken into consideration since for the different personality groups the emotion induction was influenced differently.

5 Conclusion and Further Work

In this preliminary study we inspected the influence of social context and personality factors on emotion induction from movies. We have used the LDOS-CoMoDa dataset which contains rating data and the associated context from movie consumption. The dataset also contains Big Five personality profiles of 78 users. The results have shown that there is in fact a difference in proportion of emotion induction in different social circumstances for several personality factors. These differences were statistically significant in the cases of low extroversion, low agreeableness, high agreeableness and low neuroticism. It was also observed that users with low scores (< 50) experienced emotion induction exactly in the opposite way that the users with high scores (≥ 50) for the extroversion, agreeableness and neuroticism factors. We believe this to be an interesting results since it could lead to better understanding of the influences on the emotion induction.

For the future work we plan to inspect the detected effect further, and try to incorporate the observed behavior in CARS models. At this point we do not know why personality has the observed influence on emotion induction. For future work we would like to explain this fact for an additional insight on incorporating the observed behavior in CARS. In addition, we will try to use the observed effect in order to implicitly assess the users’ personality traits from their behaviour in social and emotional contexts. Also, we believe that personality profiles and social context could be used to predict the emotional context, that was proved to improve the rating prediction [8].

6 Acknowledgement

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