How to Spread Kindness: Effects of Rewarding Elements Within a Persuasive Application to Foster Prosocial Behavior

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Abstract. For investigating whether rewarding elements within a persuasive web-application for increasing prosocial behavior are effective, we conducted an experimental field study with a self-developed web-app ($N = 42$). Two different versions of the persuasive web-app (high/low persuasive) to foster good deeds were implemented and examined during a three-week period. In both versions, the evaluation of the user-interface correlated positively with the execution of the target behavior, i.e. performing good deeds. Also, the availability of a user profile and a ranking was positively associated with performing prosocial behavior. However, there was neither a significant difference regarding the intensity of app usage nor concerning the number of performed good deeds between experimental groups (high/low persuasive). Therefore, the availability of more persuasive features does not necessarily entail more persuasion. In conclusion, we derive design suggestions for developing persuasive mobile applications which provide benefits for (pro-)social life through encouraging people to perform good deeds.

Keywords: Prosocial behavior · Good deeds · Persuasive technology
Self-monitoring · Rewards

1 Introduction

The enormous potential of persuasive technologies reveals itself when considering the amount of application fields and their empirically documented success concerning persuasive processes. Persuasive technologies are used for purposes such as the elimination of phobias [7] or saving resources [20]. While these fields are well analyzed, there are only rare insights concerning the area of prosocial behavior and inter-human relationships. However, especially in the light of fast-paced and anonymous everyday lives, the realm of social life could benefit from persuasive technologies that sensitize people regarding interpersonal relationships and prosocial behavior. To this aim, we built a persuasive web-application that encourages prosocial behavior in terms of performing good deeds through persuasive and rewarding elements. We strive to understand whether providing persuasive mechanisms contributes to encouraging the target behavior of doing good deeds. Therefore, we examined correlations between the

usage of provided persuasive features within a persuasive app and resulting behavior. Also, we analyzed differences between the effects of two different versions of the app, which was either high persuasive (extended features) or low persuasive (basic features).

2   Persuasion and Prosocial Behavior

Persuasion. Persuasion is the process of empowering people to change an attitude or a behavior towards an object or topic [6]. Persuasive technologies are interactive computer-based systems, supporting individuals to implement an anticipated revision of behavior or attitude by using empowering features [17]. Following Fogg [13], modifying behaviors and attitudes through a persuasive system mainly depends on an individuals' motivation, (perceived) abilities, self-efficacy [1, 3, 25] and on an adequate trigger causing a target behavior at a specific point of time. The effectiveness of a persuasive system can further be expanded by supplying features of personalization, social exchange [16], and principles of perceptibleness and immediateness [21].

Within a process of persuasion, rewards serve as additional motivators, reinforcing a behavioral change [8, 10, 11]. Studies regarding user activity in social networks indicate that rewards and competitive elements such as bonus points and leader boards increase the intensity of users' activity and do positively affect the power of persuasion [12, 18, 23]. Furthermore, users like to apply leader boards as tools for presenting themselves in a positive light [26]. Self-monitoring features, such as personalized behavior diagrams, graphs or diaries, further support users of a persuasive system in noticing and changing their behavior effectively. Due to the process of introspection, people receive another point of view and thus can detect and change unwanted habits [4].

As it is for all technological devices, the effectiveness of persuasive systems is further related to its user-friendliness [22], provided support, and usage intensity [15].

Prosocial Behavior. Prosocial behavior covers a broad spectrum reaching from helping other people in specific situations to being kind in everyday life [24]. Prosocial behavior means to do something good, e.g. to help others. In some cases, individuals anticipate positive returns for themselves [2, 5]. The prosocial target behavior we are trying to foster in this work is characterized by performing and documenting good deeds, encouraged through a persuasive system.

3   A Persuasive Application to Foster Prosocial Behavior

Based on prior research demonstrating the power of persuasive applications and systems [18], we developed and implemented the *Good Deeds-App*. This app allows to document and (self-)monitor good deeds. We implemented two versions of the app. As shown in Fig. 1, one with basic features (low persuasive version) and one with extended features such as bonus-points, a diagram (both within the profile) and a ranking (high persuasive version).
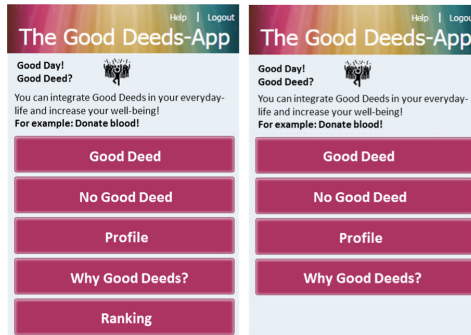
Fig. 1. Left: Extended features (high persuasive), right: Basic features (low persuasive).

3.1 Features of the Good Deeds-App

Starting page and main menu. The structure of the main menu is simple, allowing for easy usage even for unexperienced users. A randomized motivating welcome-text including an example for a good deed e.g. *"Sending a kind message to a family member or friend"* represented a behavioral trigger every time a user logged in.

"Good Deed". Text fields allow for documenting good deeds. The group with extended persuasive features was further able to collect bonus points, namely *Altruism-Stars* (five good deeds resulted into one *Altruism-Star*). Participants in this group were also informed about remaining good deeds for getting an *Altruism-Star*.

"No Good Deed". Self-reflection does not only comprise reflection of situations in which a target behavior was performed but also those in which it was not performed [13, 14]. Thus, users could click *"No Good Deed"* when they logged in but did not do a good deed. Subsequently they got a hint that it is not too late to do a good deed.

"Profile". In its basic version, the profile includes a diary displaying all performed good deeds in a chronological order and the number of good deeds per day. The app with extended features additionally provides the sub-menus *Altruism-Stars* and *Diagram* (Fig. 2). The diagram visualizes reported good deeds on a timeline, displaying an empty space when no good deed was performed.

"Why Good Deeds?". To strengthen awareness for social goods, a collection of facts explaining why doing good deeds is important and that it positively affects both, the executing and the receiving individual, was presented.

"Ranking". The ranking (only for high persuasive version), should initiate social comparison between users. The usernames and respective number of good deeds were visualized in a list that was available for every user within this group. The person at the leading position was additionally pushed via an encouraging emoticon.
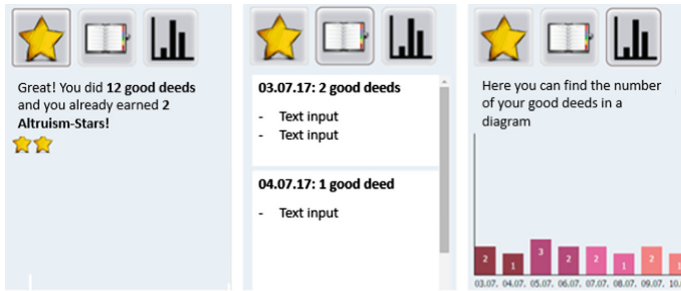
Fig. 2. Profile with extended features (left: *Altruism-Stars*, center: Diary, right: Diagram).

Trigger. Automated e-mails served as additional behavioral triggers for participants in both groups. If a participant did not log in to the app for a certain period he/she got a reminder to do so along with a suggestion to execute good deeds.

4   Derivation of Hypotheses

The aim of this empirical study is to investigate whether employing persuasive functions (e.g. self-monitoring, triggers) will empower users to conduct good deeds and whether more sophisticated functions (ranking, altruism-stars) will foster the target behavior even more strongly.

Since self-monitoring is a powerful persuasive tool [13, 14, 18, 20, 21, 26], we expect that monitoring one's own behavior through accessing the *Profile* within the app reinforces executing the target behavior of doing good deeds:

H1: There is a positive correlation between the number of profile-accesses (for monitoring one's own behavior) and the number of good deeds. More precisely, the frequency of accessing the profile can significantly explain the number of good deeds.

Further, a technology's interface can influence perceived credibility, usability and resulting joy of usage [19]. Hence, participants' evaluation of the user interface might positively correlate with utilizing the technology and consequently affect the number of good deeds:

H2: There is a positive correlation between the evaluation of the persuasive app and the number of good deeds.

Social comparison can increase behavioral engagement [4, 14, 18, 23]. Since one group had access to a ranking, we suppose that within this group the number of clicks on *Ranking* correlates with the number of good deeds:

H3: There is a positive correlation between the number of clicks on the ranking and the total number of good deeds.

Rewards arising from commendation, rankings, or bonus points can strengthen a person's willingness to change a habit [14, 23]. Concurrently, rewarding elements can increase positive experiences [10]. Based on this, we suggest that participants in the group with high persuasive features (extended version) use the app more intensely:

H4: *Participants who use the app with extended functions show a higher overall click frequency than participants who use the app with basic functions.*

H5: *Participants who use the app with extended functions show a higher click frequency for the Profile than participants who use the app with basic functions.*

Due to the different versions of the app (high/low persuasive), we suppose that there is a difference concerning the overall effect of using the introduced application. Consequently, we formulate the following hypothesis:

H6: *There is a difference between the groups regarding the number of good deeds.*

Additionally, we were interested in whether the different versions of the app fostered different types of good deeds. Following this question, we set the following explorative research question and qualitatively investigated users' text inputs:

RQ: *Is there a difference between the groups regarding the content of good deeds?*

5   Method and Sample

We conducted an experimental field study with a between subjects-design over a three-week period. The goals were to demonstrate that an app (operated under field conditions) can foster prosocial behavior and to analyze whether the employment of more persuasive strategies will increase this effect. Therefore, we varied the availability of rewarding elements (*Altruism-Stars*), positive feedback, a ranking and self-monitoring features (diary, diagram). Data was gathered via online questionnaires and behavioral log data of app usage.

In sum, 42 persons (23 female) participated in the study. In each condition, there were $n = 21$ participants (high persuasive: 8 female, $M_{age} = 28.05$, $SD_{age} = 8.45$ vs. low persuasive: 15 female, $M_{age} = 26.19$, $SD_{age} = 7.65$).

5.1   Variables

We investigated participants' satisfaction with the user-interface by means of adapted items from the *Questionnaire for User Interface Satisfaction* by Chin, Diehl and Norman [9], ($\alpha = .882$). For analyses, we used items concerning "overall impression" (e.g. "My impression of the app is 1 = horrible/10 = wonderful"), "screen" (e.g. "The arrangement of information on the screen is 1 = hard to read/10 = easy to read"), "terminology and system information" (e.g. "Terminology is 1 = not consistent/10 = consistent") and "learning" ("Learning how to use the app was 1 = hard/10 = easy") of the mentioned scale [9]. Furthermore, the frequency of clicks on every button as well as the number of active days within the app have been tracked. The number of active days within the web app was determined by summing up all days on which at least one menu item was clicked. To answer the stated research question, users' text inputs (good deeds) were qualitatively analyzed and clustered into categories by two independent coders ($\kappa = .922$, $p < .01$).

6   Results

6.1   Descriptive Results

We recommended to use the application at least once a day. However, in sum, participants spent between two and 16 days within the app ($M = 6.00$, $SD = 2.83$).

Good Deeds. Altogether, participants stored 234 good deeds ($M = 5.57$, $SD = 2.96$). Most commonly, people documented between three and six good deeds. On average, female participants stored more good deeds ($M = 6.22$, $SD = 3.06$) than male participants ($M = 4.79$, $SD = 2.67$).

Number of clicks. The overall number of clicks was 970 ($M = 23.10$, $SD = 20.08$). Participants in the group with extended functions had a total click rate of 520 ($M = 24.77$, $SD = 27.04$), participants in the group with basic functions clicked 450 times ($M = 21.43$, $SD = 9.45$).

6.2   Hypotheses Testing

H1. We conducted a regression analysis revealing a significant positive relation between the frequency of profile accesses and the number of good deeds ($R^2 = .339$, $F(1,40) = 20.54$, $\beta = .582$, $t = 4.53$, $p < .001$). The frequency of accessing the profile explained 34% of the variance of documented good deeds. Consequently, the first hypothesis was supported.

H2. To examine possible relations between the evaluation of the user-interface and the number of good deeds we conducted several analyses of correlation. There were significant positive correlations between two dimensions of the scale for evaluation of the user-interface and the number of good deeds, namely for "learning" ($r = .352$, $p < .05$) and "terminology and system information" ($r = .356$, $p < .05$). Therefore, hypothesis 2 can partially be accepted.

H3. The assumption of a positive relation between the frequency of accessing the ranking and the number of good deeds (high persuasive version) was tested via an analysis of regression and indicated a significant positive relation ($R^2 = .249$, $F(1,19) = 6.31$, $\beta = .449$, $t = 2.51$, $p < .05$). The frequency of clicking *Ranking* explained 25% of variance of the number of good deeds. We therefore accept hypothesis 3.

H4. We need to reject the fourth hypothesis since there was no statistically significant higher click rate for participants using the app with extended functions.

H5. Concerning the number of profile visits we found, contrary to the hypothesis, that participants using the app with basic functions accessed their profile more often than participants using the app with extended features ($F(1,39) = 12.00$, $p < .001$, $\eta^2 = .235$, user-interface evaluation was considered as a control variable). Therefore, hypothesis 5, in the way it was stated, needs to be rejected.

H6. Most central, we suggested a difference between the groups concerning the overall number of good deeds. The group with extended functions stored 100 good deeds ($M = 4.76$, $SD = 2.32$), whereas the group with basic functions in fact documented more good deeds (134, $M = 6.38$, $SD = 3.34$). However, the difference was not statistically significant. Therefore, hypothesis 6 needs to be rejected.

RQ. Analyses revealed seven categories of good deeds: "partner", "friends", "family", "strangers", "animals", "colleagues", "others". Most good deeds were performed for "strangers", whereby participants using the app with extended functions stored 37 ($M = .37$, $SD = .48$), and participants using the app with basic functions stored 44 good deeds ($M = .33$, $SD = .47$) in that category. Fewest good deeds were conducted for "animals". Within the group with extended functions, three good deeds were documented in that category ($M = .03$, $SD = .17$), the group with basic functions did five good deeds in that category ($M = .04$, $SD = .19$). Altogether, participants using the app with extended functions did significantly more good deeds within "partner" ($\chi^2 (1, N = 42) = 5.81$, $p < .05$), while participants of the other group did significantly more good deeds within "family" ($\chi^2 (1, N = 42) = 5.29$, $p < .05$).

7   Discussion

The experimental field study, which for the first time tested the effects of various persuasive strategies on performing prosocial behavior yielded numerous interesting results. Among others, we identified which features are most important in fostering prosocial behavior and further addressed the question whether more features lead to more and stronger effects.

We found that the amount of performed good deeds is attributable to the quantity of accessing the *Profile* (H1) and conclude that the functionality of an individual profile can help to perform a target behavior. In line with previous findings [13, 14, 18, 26] this indicates that self-monitoring is indispensable for a persuasive technology. Even if we acknowledge that the causality can also be reversed, meaning that participants, after storing a good deed, were interested in checking their profile, it is still remarkable that users felt the urge to check on their "status" instead of storing a good deed and closing the app. Since the profile differs between the groups with respect to provided self-monitoring functions, but the relation is present for the whole sample, it can be assumed that the functionality of the overall opportunity of self-observation was relevant for the process of persuasion, while the extended features of different self-monitoring functions do not seem to be particularly relevant.

Data further show that positive user-interface evaluations are related to the likelihood of storing good deeds (H2). This underlines the importance of the app's functionality and a positive evaluation by the users. In line with this, we want to acknowledge that the interface received altogether positive ratings.

When analyzing the relation between clicks on the ranking and the number of reported good deeds (H3), we found a significant result demonstrating that the more often participants checked the rating, the more good deeds they reported. Even though this might merely indicate that people who entered the app to store a good deed

afterwards checked on their position in the ranking (instead of purposefully look this up), this still means that the ranking was relevant for them and thereby will have executed an effect. In line with prior findings [18] we conclude that striving for a good position in a ranking enhances the motivation for executing the target behavior. The ranking potentially served as a type of self-control and provided additional rewards when reaching a good position. However, it did not lead the participants in the group with extended functions to perform more good deeds than the group with basic functions. The persuasive power therefore seems to be restricted.

Examining hypothesis 4, we found that the groups did not significantly differ regarding overall click frequency. However, we found a significant difference when only investigating the frequencies of clicking the ranking. Contrary to our hypothesis (5), participants from the group with basic functions actually checked their *Profile* more often. It can also be derived that the power of persuasion does not increase proportionally with the number of provided self-monitoring-features but that one adequate measure for self-observation might be sufficient.

Contrary to our hypothesis we did not find a significant difference between the groups regarding the number of good deeds (H6). It is important to note that this is, for example, not merely due to lack of statistical power but that on a descriptive level the group with only basic functions even reported more good deeds than the group with extended persuasive features. It can be assumed that the participants of the experimental group with extended features were equally satisfied with available functions and provided rewards, such as the participants of the group with basic functions were pleased with the provided functions. Each group for itself may have perceived an adequate support. Therefore, the execution of good deeds was equally supported and encouraged. Strikingly, the most rewarding element for a conducted good deed, the *Altruism-Star*, was not sought-for. Only eleven participants documented five good deeds and were therefore rewarded with an *Altruism-Star*. In order to check whether the star – once received – will be able to increase the motivation to use the app and to perform more good deeds, future studies should consider to provide such bonuses earlier. Furthermore, usage phases should take a longer period of time.

Most good deeds were stored within the category "strangers" (RQ). This category is often neglected under conventional circumstances in terms of good deeds. The effectiveness of the *Good Deeds-App* has been confirmed exactly in this area. In addition, numerous good deeds within the categories "friends" and "colleagues" were accomplished, whereas the number of good deeds within the categories "partner" and "family" were lower. It can be assumed that performing good deeds for the immediate environment requires less support by a technology or that assistance and prosocial behavior within the immediate social environment are taken for granted and were therefore not documented.

8   Conclusion

The aim of this study was to investigate the influence of persuasive elements on the likelihood of doing good deeds encouraged through an application for enhancing prosocial behavior. We varied availability of rewarding elements such as bonus points

(*Altruism-Stars*) and positive feedback as well as a ranking-list and self-monitoring functions (diary, diagram), for testing if more features yield more target behavior.

The current study indicates that this is not the case: The availability of more features and functions did neither lead to more reported target behaviors nor to extended usage of the app and its features. Considering the data as a whole, we conclude that the most important functions were sufficiently represented in the basic version. Providing more persuasive opportunities does not necessarily help in terms of larger persuasive power. One of the functions that was not available in the basic version (ranking) yielded indeed enormous interest by the respective group and was also shown to be related to reporting the target behavior but was not able to spur behavior in a sufficient manner. The execution of the target behavior was shown to be related to usage of the profile as a self-monitoring feature. Moreover, we can derive that the positive evaluation of the user interface plays an important role for using the app as well as for the performance of the target behavior.

In spite of the mentioned limitations our work contributes to the state of the art by demonstrating that persuasive technologies can foster prosocial behavior and that more features do not necessarily lead to more persuasion especially if they address redundant functions and strategies. Nevertheless, persuasive technologies fostering prosocial behavior are promising for improving interpersonal relationships and well-being for a large number of people.

References

1. Ajzen, I.: The theory of planned behavior. Organ. Behav. Hum. Decis. Process. **50**, 179–211 (1991)
2. Aronson, E., Akert, R.M., Wilson, T.D.: Sozialpsychologie, 8th edn., p. 398. Pearson Deutschland GmbH, Hallbergmoos (2014)
3. Bandura, A.: Self-Efficacy: The Exercise of Control. Freeman, New York (1997)
4. Bang, M., Torstensson, C., Katzeff, C.: The powerhouse: a persuasive computer game designed to raise awareness of domestic energy consumption. In: Ijsselsteijn, W., de Kort, Y., Midden, C., Eggen, B., van den Hoven, E. (eds.) Persuasive Technology, pp. 123–132. Springer Verlag, Berlin (2006). https://doi.org/10.1007/11755494_18
5. Batson, C.D.: The Altruism Question: Toward a Social-psychological Answer, p. 50. Lawrence Erlbaum Assoc Inc., Hillsdale, New Jersey (1991)
6. Bohner, G., Dickel, N.: Attitudes and attitude change. Ann. Rev. Psychol. **62**, 391–417 (2011)
7. Botella, C., García Palacios, A., Rivera, B., María, R., Quero Castellano, S.: Cybertherapy: advantages, limitations, and ethical issues. PsychNology J. **7**, 77–100 (2009)
8. Busch, M., Schrammel, J., Tscheligi, M.: Personalized persuasive technology - development and validation of scales for measuring persuadability. In: Berkovsky, S., Freyne, J. (eds.) Persuasive Technology, pp. 33–38. Springer, Berlin (2013). https://doi.org/10.1007/978-3-642-37157-8_6
9. Chin, J.P., Diehl, V.A., Norman, K.L.: Development of an instrument measuring user satisfaction of the human-computer interface. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 213–218. ACM, New York (1988)

10. Deterding, S., Dixon, D., Khaled, R., Nacke, L.: From game design elements to gamefulness: defining "gamification". In: Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, pp. 9–15. ACM, New York (2011)

11. Deterding, S.: Eudaimonic design, or: six invitations to rethink gamification. In: Fizek, S., Fuchs, M., Ruffino, P., Schrape, N. (eds.), pp. 305–331. Meson Press, Lüneburg (2014)

12. Farzan, R., DiMicco, J.M., Millen, D.R., Dugan, C., Geyer, W., Brownholtz, E.A.: Results from deploying a participation incentive mechanism within the enterprise. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 563–572. ACM, New York (2008)

13. Fogg, B.J.: A behavior model for persuasive design. In: Proceedings of the 4th International Conference on Persuasive Technology, pp. 40:1–40:7. ACM, New York (2009)

14. Fogg, B.J.: Persuasive Technology: Using Computers to Change What We Think and Do. Morgan Kaufmann, Elsevier, San Francisco (2003)

15. Fogg, B.J., Tseng, H.: The elements of computer credibility. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 80–87. ACM, New York (1999)

16. Fogg, B.J., Marshall, J., Laraki, O., Osipovich, A., Varma, C., Fang, N., Paul, J., Rangnekar, A., Shon, J., Swani, P., Treinen, M.: What makes web sites credible?: a report on a large quantitative study. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 61–68. ACM, New York (2001)

17. Fogg, B.J., Cuellar, G., Danielson, D.: Motivating, influencing, and persuading users. In: Sears, A., Jacko, J.A. (eds.) The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications, 2nd edn, pp. 133–147. Taylor & Francis Group, New York (2007)

18. Foster, D., Lawson, S., Blythe, M., Cairns, P.: Wattsup?: motivating reductions in domestic energy consumption using social networks. In: Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries, pp. 178–187. ACM, New York (2010)

19. Halko, S., Kientz, J.A.: Personality and persuasive technology: an exploratory study on health-promoting mobile applications. In: Ploug, T., Hasle, P., Oinas-Kukkonen, H. (eds.) Persuasive Technology, pp. 150–161. Springer, Berlin (2010). https://doi.org/10.1007/978-3-642-13226-1_16

20. Kappel, K., Grechenig, T.: "Show-me": water consumption at a glance to promote water conservation in the shower. In: Proceedings of the 4th International Conference on Persuasive Technology, pp. 26:1–26:6. ACM, New York (2009)

21. Laschke, M., Diefenbach, S., Heidecker, S., Hassenzahl. M.: Transformationale Produkte: Acht Konzepte zum schonenden Umgang mit Ressourcen. In: Ziegler, J., Schmidt, A. (eds.) Mensch und Computer 2010: Interaktive Kulturen, pp. 189–194. Oldenbourg Verlag, München (2010)

22. Lee, Y., Kozar, K.A.: Understanding of website usability: specifying and measuring constructs and their relationships. Decis. Support Syst. **52**, 450–463 (2012)

23. Mekler, E.D., Brühlmann, F., Opwis, K., Tuch, A.N.: Do points, levels and leaderboards harm intrinsic motivation?: An empirical analysis of common gamification elements. In: Proceedings of the First International Conference on Gameful Design, Research, and Applications, pp. 66–73. ACM, New York (2013)

24. Schwartz, S.H., Howard, J.A.: In: Bierhoff, H.-W. (ed.) Sozialpsychologie: Ein Lehrbuch, pp. 96–139. Kohlhammer, Stuttgart (1981)

25. Spahn, A.: And lead us (not) into persuasion…? Persuasive technology and the ethics of communication. Sci. Eng. Ethics. **18**, 633–650 (2012)

26. Sra, M., Schmandt, C.: Spotz: a location-based approach to self-awareness. In: Berkovsky, S., Freyne, J. (eds.) PERSUASIVE 2013. LNCS, vol. 7822, pp. 216–221. Springer, Heidelberg (2013). https://doi.org/10.1007/978-3-642-37157-8_26