

Persuasive Dialogue System for Energy Conservation

Jean-Baptiste Corrége¹, Céline Clavel¹, Nicolas Sabouret¹, Emmanuel Hadoux², Anthony Hunter², & Mehdi Ammi¹

¹LIMSI, CNRS, Université Paris-Saclay, F-91405 Orsay, France

²Department of Computer Science, University College London, London, UK

✉ jean-baptiste.correge@limsi.fr

Introduction

In order to design dialogue systems dedicated to promote energy conservation, we consider ways to shape the system's arguments in the most persuasive way possible [5]. One such way could be through framing the information in order to make it more easily processed by the system's users [10].

Related Work

The messages might be framed according to their emotional valence [1]. Emotions are of special interest because they affect not only what people think (their mood or the way they feel), but also how they think (cognition itself). Indeed, emotions arise from patterns of judgments made by individuals in reaction to their environment and the relationship they have with it, or appraisals [6]. According to [8], these appraisals are based on several checks related not only to the stimuli but also to the self: relevance (novelty, pleasantness, goal relevance), implication (causal attribution, outcome probability, discrepancy from expectation, goal/need conduciveness, urgency), coping potential (control, power, adjustment), and normative significance (internal standards, external standards). Consequently, different patterns of appraisal generate different cognitive responses and coping strategies. These strategies are either problem-focused (i.e. change the situation itself) or emotion-focused (i.e. change the relation to the situation; [9]). Thus, different information are processed more or less efficiently according to the coping strategies set up [3]. For example, guilt leads to problem-focused strategies, because it is associated with an error that has been made and a will to repair the wrong made. On the contrary, shame leads to emotion-focused strategies, because it is associated with negative implications for one's self-esteem and a perceived lack of capacity to change the environment. Consequently, a positively-framed message associated with guilt ("What you have to gain by drinking responsibly") is processed more fluently than a negatively-framed message associated with guilt ("What you have to lose by not drinking responsibly"). Conversely, the same positively-framed message is processed less fluently when associated with shame than the same negatively-framed message. Thus, by varying emotional valence and message-framing, one could improve a speech's impact on their conversation partner.

Another interesting lead could be to assess user's personality. Traits like regulatory focus [4], for example, have been shown to influence directly how individuals make judgements and decisions [2]. Individuals are generally either promotion-focused (i.e. gain-oriented, and seeking to achieve opportunities) or prevention-focused (i.e. loss-oriented, and seeking to avoid failures) and make decisions accordingly. For example, promotion-focused individuals are more receptive to promotion-focused information and vice versa. Similarly to what has been demonstrated with coping strategies, framing influences individual's cognitive processing of the messages [7]. Specifically, a promotion-focused individual will process faster a message emphasizing positive aspects of a product and possible gains associated with it ("This juice contributes to the creation of greater energy"), while a prevention-focused individual will process faster a message emphasizing aspects that would prevent them from possible losses ("This juice contributes to healthy cardiovascular function."). This increased fluency has a direct impact on individuals' preferences and decisions [7].

Study

Because promotion-focused individuals are more sensitive to gains and prevention-focused individuals are more sensitive to losses, it might be very possible that the emotional valence (pleasant vs. unpleasant) could moderate the influence of gain/loss framing in a way that has not yet been investigated. In order to assess this potential influence, we propose an exploratory study to compare different framing configurations. Specifically, we propose to develop a 2 (valence framing of the speech: pleasant vs. unpleasant) x 2 (framing of the messages: gain vs. loss) experimental design. Such a study could be designed as an online investigation divided into the following steps: it is first necessary to evaluate participants' regulatory focus, attitude towards environment and current emotional state. Once it is done, they are proposed a short speech promoting the behavior. Then, participants' intention to perform the behavior is assessed before finally evaluating again their emotional state in order to check if the message had an effect.

The content of the speech would vary according to the experimental condition and could include messages such as:

- Saving energy today will save polar bears (positive valence and framing)
- Saving energy today will allow polar bears not to die (positive valence and negative framing)
- Wasting energy today kills polar bears (negative valence and positive framing)
- Wasting energy today will not allow to spare polar bears (negative valence and negative framing)

Results could allow to evaluate relative impact of the couples' influence on judgement and intention to perform the advertised behavior. Moreover, questionnaires assessing personality would allow to further explore these effects by evaluating how emotion and personality interacts.

Conclusion and Future Work

On the longer term, it is possible to consider a system which would autonomously either evaluate or prime a given emotion. Considering the fact that specific emotions are linked to specific attentional focus, the system could adapt the content and form of its speech accordingly in order to maximize its efficiency. Moreover, if such a system was able to evaluate and model user's personality, it would be able to adjust its speech and select arguments that are the most susceptible to be persuasive.

References

1. Achar, C. et al.: What we feel and why we buy: the influence of emotions on consumer decision-making. *Curr. Opin. Psychol.* 10, 166–170 (2016).
2. Cesario, J. et al.: Regulatory Fit and Persuasion: Basic Principles and Remaining Questions. *Soc. Personal. Psychol. Compass.* 2, 1, 444–463 (2008).
3. Duhachek, A. et al.: Guilt versus shame: coping, fluency, and framing in the effectiveness of responsible drinking messages. *J. Mark. Res.* 49, 6, 928–941 (2012).
4. Higgins, E.T.: Beyond pleasure and pain. *Am. Psychol.* 52, 12, 1280 (1997).
5. Hunter, A.: Opportunities for Argument-Centric Persuasion in Behaviour Change. In: *Proceedings of the 14th European Conference on Logics in Artificial Intelligence - Volume 8761*. pp. 48–61 Springer-Verlag New York, Inc., New York, NY, USA (2014).
6. Lazarus, R.S.: Progress on a cognitive-motivational-relational theory of emotion. *Am. Psychol.* 46, 8, 819 (1991).
7. Lee, A.Y., Aaker, J.L.: Bringing the Frame Into Focus: The Influence of Regulatory Fit on Processing Fluency and Persuasion. *J. Pers. Soc. Psychol.* 86, 2, 205–218 (2004).
8. Scherer, K., R.: Appraisal considered as a process of multilevel sequential checking. *Apprais. Process. Emot. Theory Methods Research.* 92, 120, 57 (2001).
9. Smith, C.A., Kirby, L.D.: Putting appraisal in context: Toward a relational model of appraisal and emotion. *Cogn. Emot.* 23, 7, 1352–1372 (2009).
10. Tversky, A., Kahneman, D.: The framing of decisions and the psychology of choice. *Science.* 211, 4481, 453–458 (1981).