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Use of psychophysiological measurements in
communication research: teachings from two studies of
corporate reputation

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Abstract: In this paper we evaluate the possibilities psychophysiological study of emotions can offer to communication research, main focus being on studies of

organizational reputation. We briefly discuss the study of emotion in communication sciences and then describe the experimental protocol for studying reputation and emotions with the psychophysiological methods and offer some empirical results from our first experiments. The results obtained from studies reviewed in this paper show that reputation is at least partly emotional appeal and hence can be measured on an individual level through bodily reactions. Secondly, the results show that the valence of company-related content (e.g., news) also has emotional implications and thus consequences. After presenting the studies we discuss our findings and reflect our observations during the research collaboration from two different perspectives: methodological and theoretical.

Keywords: psychophysiology, reputation, emotions, experiments, organizational communication

Utilisation des mesures psychophysologiques dans la recherche en communication: résultats des deux études de réputation de l'entreprise

Résumé: Dans cet article, nous évaluons ce que l'étude des possibilités psychophysologiques des émotions peut offrir à la recherche en communication, l'accent étant mis sur les études de réputation des organisations. Nous avons d'abord brièvement étudié l'émotion dans les sciences de la communication et sommes ensuite passés à la description du protocole expérimental pour l'étude de la réputation et des émotions avec les méthodes psychophysologiques sur la base de deux projets de recherche afin d'offrir quelques résultats empiriques de nos premières expériences. Les résultats obtenus sur la base des études évoquées dans le présent article montrent que la réputation est au moins en partie l'attrait émotionnel et peut donc être mesurée au niveau individuel par des réactions corporelles. Deuxièmement, les résultats montrent que la valence de contenu de la société liée (par exemple, des informations) a également des implications émotionnelles et donc des conséquences. En outre, les résultats préliminaires indiquent que le contexte transmet de nouvelles marques avec différents médias et a une influence sur le taux d'attention et le rappel des informations de presse après l'exposition. Après avoir présenté les études, nous avons présenté nos résultats et reflété nos observations durant la collaboration pendant recherche sous deux angles différents: méthodologique et théorique.

Mots-clés : psychophysologie, émotions, réputation, méthodes expérimentales, communication organisationnelle

Introduction

The purpose of this article is to elaborate the possibilities psychophysiological methods of studying emotions and motivation can offer to communication research. Our notions are based on three experiments we conducted to investigate the emotional aspects of organizational reputation using psychophysiology, a division of psychology that studies changes in the activity of physiological systems caused by psychological processing (Turner, 1994; Cacioppo & Tassinary, 1990).

We build upon the view that emotions guide human cognition and that communication-related emotional experiences have a powerful influence on human behaviour (e.g., Damasio, 1994). So far, only few studies explicitly and empirically link the macro-level, sociological phenomenon of organizational reputation with the micro-level psychological phenomena of emotions and attention. With our experimental settings we aimed to find out whether the evaluation of reputation by individuals is connected to psychophysiological responses evoked by the organizations.

In this article we first briefly present how the role of human emotions in communication processes can be studied. Next, we discuss the teachings and findings of three multidisciplinary studies where experimental, psychophysiological methods were utilized. Based on these findings, we elaborate the strengths and limitations of experimental, psychophysiological methods as a part of communication studies.

1. Emotions in communication and reputation research

Since 1980s there has been an increasing interest towards emotions in communication and social research (Döveling, von Scheve, & Konijn, 2011; Frijda, 1986), declared as 'the affective turn' of social sciences (Clough & Halley, 2007). This sociological interest in emotions has been intact from psychological research, partly because different disciplines have developed slightly differing definitions of emotions (Izard, 2007; A. Lang & Ewoldsen, 2011; Döveling et al., 2011). A more fundamental epistemological difference lays between positivist and interpretivist approaches (Sturdy, 2003); the general question of whether emotions are altogether measurable and quantifiable. Positivist approaches measure variables that affect emotions or are affected by them. By contrast, the interpretivist approach focuses on the more descriptive nature of emotions, and on the ways how they are represented and discursively produced. For interpretivists language is the principal tool for meaning-making (e.g., Gerth & Mills, 1954), thus emotions are defined by the way they are described in language.

The interpretative tradition of researching emotions in media studies focuses on the ways they are expressed and mediated through media texts (e.g., Grabe, Zhou, &

Barnett, 2001; Siegl & Foot, 2004). Beyond the textual level methodologies an emerging field of emotional media effect studies looks at the role of emotions in media message processing (Nabi, 2009; Konijn & Ten Holt, 2011). These studies show that first, emotion and attention are strongly connected: in general negative messages capture more attention than positive messages (e.g., Bolls, Lang, & Potter, 2001). Further, emotions and recall of information are connected. Increased emotional arousal has been suggested to result in better storing of messages in long-term memory (A. Lang, Newhagen, & Reeves, 1996). Persuasive messages seem to be more effective if they are emotionally arousing (Gresham & Shimp, 1985; Hazlett & Hazlett, 1999). In addition, emotions are likely to have strong behavioural consequences. In online communications settings, for example, any content or application that elicits positive emotions is most likely preferred (Ravaja, 2004).

Combining these approaches we state that emotions should not be reduced to mere measurements, but they should be situated and studied in a social context, and the measurable and interpretative are inseparable (e.g., Benton, 1991) – a multidimensional concept such as emotion calls for multidisciplinary studies (Sturdy, 2003).

1.1. *Reputation as an emotional experience*

This article builds on corporate reputation studies. Reputation can be defined as the overall aggregate of views held by people outside a corporation (Fombrun, Gardberg, & Sever, 2000; Barnett, Jermier, & Lafferty, 2006; Aula, 2011). The classical way of approaching and measuring reputation is based on the stakeholders' knowledge of a company and on rational arguments based on this knowledge (Fombrun et al., 2000; Aula & Mantere, 2008). However, recent emphasis of emotions has fostered growing interest in the emotional aspects of reputation as well. Thus reputation consists not only of the *knowledge* about a company's true characteristics but also of the stakeholder *emotions* towards the firm (Ferguson, Deephouse, & Ferguson, 2000; Hall, 1992; Fombrun & Shanley, 1990). Reputation thus builds also on *emotional appeal* (Fombrun et al., 2000).

Building on this notion, we adopt the view that *reputation as an emotional experience* has a powerful influence on stakeholder decision making. Emotional reputation is formed by the direct experiences stakeholders have with a company (Kazoleas, Kim & Moffitt, 2001), but in addition, based on reputational information (Mahon & Wartick, 2003; Bromley, 2000), offered by the media, government, or other individuals. Next, we briefly describe how emotional responses can be measured and outline the experimental settings we conducted to study organizational reputation using psychophysiological methods.

2. Emotions and psychophysiology

Many psychology-based emotion theorists endorse the view that emotions are constituted by three intertwined components: subjective feeling (e.g., feeling angry), expressive behaviour (e.g., severe frown) and a physiological component (e.g., sympathetic nervous system activation), (Lang, 1995). In general, two basic models of emotion can be distinguished: dimensional and discrete (Nabi, 2010). Dimensional model sees emotions as a motivational state characterized by two or three broad affective dimensions, whereas discrete emotion perspectives identify emotional states by the unique set of cognitive appraisals, or thought patterns, underlying them. The psychophysiological method builds on the dimensional theory, where all emotions can be placed in a two-dimensional space, defined by valence and arousal (Lang, 1995; Russell, 1980). The valence dimension varies from unpleasant to pleasant, and the arousal defines the level of bodily activation from calm to excited state.

Facial electromyography (EMG) has been used to study the hedonic valence (Cacioppo, Petty, Losch, & Kim, 1986). Increases in the activation of the cheek (*zygomaticus major*) muscle area have been associated with positive emotions, whereas increases in the activation of the brow (*corrugator supercillii*) muscle region have been associated with negative emotions (Witvliet & Vrana, 1995). Periocular (*orbicularis oculi*) muscle area activity appears to be particularly high during positively valenced high-arousal emotions (Ravaja, 2004). For the measurement of arousal, sweat glands activation known as electrodermal activity (EDA) is an important index. Finally, attention is measured with electroencephalography (EEG). There is an agreement that increased activity in the broad alpha band (8-13 Hz) of EEG is inversely related to neural processing; alpha power decreases when the underlying cortical systems engage in active processing. In addition, frontal alpha asymmetry is a widely used metrics assessing approach/withdrawal motivational behaviour (Coan & Allen, 2004).

These methods have been previously used for example to study the bodily responses evoked by news messages (e.g., Ravaja, Saari, Kallinen, & Laarni, 2006; Grabe, Lang, Zhou & Bolls, 2000), responses to slow websites (Sundar & Wagner, 2002), and to different kinds of affective content (e.g., Bolls, et al., 2001; Hubert & De Jong-Meyer, 1990). Regarding organizational communication studies adapting psychophysiological techniques have focused mostly on processing marketing information and economic decision making (e.g., Braeutigam, 2005; Lee & Chamberlain, 2007; Rossiter, Silberstein, Harris, & Nield, 2001).

2.1. *Psychophysiological research designs*

This article builds on experiences from three experimental settings looking into the psychophysiological effects elicited by reputation and different elements of digital communication: news messages, peer comments, and media brands.

Study 1 focused on psychophysiological responses during a reputation appraisal process of good- and bad-reputed companies. Companies used were selected from a longitudinal reputation evaluation study of Finnish listed companies. In addition, the reputation of the companies was evaluated separately by each subject. Company names written in plain text were shown individually in a randomized order while the subject was asked to rate the reputation of each company. This procedure is widely used in psychophysiological research when studying emotions evoked by visual stimuli (e.g., Aftanas et al., 2004).

In **Study 2** the aim was to study how positive and negative news messages of positive and negative-reputation companies affect subject's perception of the reputation of these companies and his or her psychophysiological responses. Our design involved positive or negative news messages of companies with good or bad reputation, accompanied by comments (positive or negative) allegedly made by other readers. This setting enabled us to study the social aspects of online media.

Study 3 was conducted to find out how audiences' mental images of media brands affect the interpretation and recall of news messages. We created a setting in which identical news stories were framed with different media for different participants. In addition, the content the news messages varied on two dimensions: valence and the relevance of the message to the participant. The media frames were selected based on a nation-wide survey, and again also evaluated separately by each subject.

3. Discussion: lessons learned

The conducted studies allowed us to evaluate, establish and validate psychophysiological measures related to reputation processing. We can conclude that the psychophysiological method is a feasible way to study the mental processes related to organization-stakeholder communication on an individual level. The results show that reputation is at least partly emotional appeal and hence can be measured through bodily reactions. Secondly, the valence of company-related content also has emotional implications and consequences. Study 3 showed that framing news with different media brands affects the amount of attention directed towards the news and the recall of news content.

3.1. *Methodological reflections*

Psychophysiological measurements provide several benefits when compared to traditional self-reported measures. As the majority of emotional responses are controlled automatically and independently of any conscious process (Dimberg, 1997; Zajonc, 1980), psychophysiological measurements have showed to be more sensitive than traditional measures due to their temporal and validity accuracy (Neumann, Seibt, & Strack, 2001). First, self-reported data may be affected by the tendency to answer in a socially acceptable way, whereas using psychophysiology also unconscious processing may be studied. In addition, psychophysiological data can be collected continuously during the whole experiment (e.g., interacting with a service). Thus psychophysiological signals have a good temporal accuracy and it is possible to distinguish the reactions elicited by a specific stimulus.

One limitation posed by the laboratory conditions is reduced ecological validity, as it is impossible to cover the rich online environment in detail. To ensure right variables are being measured (e.g., reputation vs. visually appealing logo), simplistic versions or the stimuli are required. That is why effort has to be put to the preparation and pre-validation of the stimulus material. Further, during the experiment it is difficult to use e.g., textually multifaceted material as a stimulus, since when measuring we need to be sure what the subject is predisposed to. This excludes some interactive aspects of new media environments and makes creating actual mixed methods designs difficult. For instance, we could not ask subjects to write news comments during the experiment, since using the keyboard alone elicits so much cortical activity and eye activation that the EEG signal becomes hard to interpret. In the future more experimental planning should be made to achieve more ecologically valid settings capturing the multimodal environments and the effects of reputation in online arenas. One possible solution to increase validity is to let the participant review the experimental session afterwards, e.g. using a video recording (Eveland & Dunwoody, 2000).

3.2. *Theoretical reflections*

The theory-related challenges in conducting psychophysiological measurements were posed by the fact that communication or reputation theories are rather multifaceted and contain factors that cannot be directly measured using psychophysiology. Thus we cannot create a setting that fully complies with the previous theoretical standpoints but some aspects need to be simplified or studied separately. Another problematic aspect is the historical dimension of certain concepts. Reputation, for instance, is a construct based on previous experiences and personal encounters with an organization. Therefore it is hard to manipulate in a controlled laboratory setting, and collecting subjective reputation evaluations is required.

Further, not all feelings can be measured with the psychophysiological method: emotions that require cognitive processing, such as hope, or many social emotions, such as envy (Averill, 1996), are difficult to identify by bodily responses. In addition, emotions in an organizational setting and in the online communication environments as well can exist as collective or shared phenomena. Collective dimension of emotions is more difficult to incorporate in a laboratory study. It is challenging to measure more than one or two persons simultaneously, and studying actual social situations is still rather uncommon.

In general, these limitations relate to the discussion of dimensional versus discrete emotions (Nabi, 2010) presented earlier; defining emotions as discrete sets of appraisals might better capture the complicated implications of emotions and motivations, and allow larger exploration of communication-based phenomena. However, this should not lead to completely isolated approaches; studying emotions as a textual phenomenon should not lead to using vague, general concepts without consulting the more precise dimensional definitions. We follow the critique expressed by Andrew Sturdy (2003) that it is important to develop theories as well, not only conduct empirical and applied studies. However, in experimental research the theories are being iteratively tested by various researchers, and several experiments are needed before it is meaningful to begin theorizing. We hope comprehensive theories on emotional reputation can be formulated after additional experiments accumulate more empirical results.

Concluding remarks

Our studies shed light to the individual level of reputation formation and demonstrated that psychophysiological measurements are a feasible method to combine the levels of theoretical and empirical knowledge. Since we are applying the method to a new area, the first experiments give us important guidelines for selecting the best signals for further studies. In the context of reputation studies, our experiences suggest that the valence and arousal dimensions of emotions can be assessed reliably with electromyography and electrodermal activity, respectively. In addition, electroencephalography served well as an index of attention and approach/withdrawal motivation. These signals may turn out to be fruitful also in other areas of communication research.

As the effectiveness of psychophysiological measurements in this research area has been validated, it is possible to build more complicated settings. Our multidisciplinary collaboration taught us that when a traditionally interpretative science meets positivist science, some simplifying, explicating, and flexibility is needed. However, being confronted with other theoretical and ontological viewpoints will not only create new and innovative research topics, but will help to clarify one's own position better as well. In the long run, this will lead to more

comprehensive and sophisticated research on the effects of emotions in communication.

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