Social neuroscience: new approaches for public relations and communications management[1]

Neurociência social: novas abordagens para a gestão das relações públicas e das comunicações

Neurociencia social: nuevos enfoques para la gestión de las relaciones públicas y de las comunicaciones

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Abstract

Advances in cognitive neuroscience and the mapping of the human brain provide great opportunities for the fields of public relations and communications to begin to more clearly understand how storytelling, strategic messaging and communication activities influence human perceptions of trust, credibility and authenticity. This essay provides insights into the interconnections between professional communications and how the science of how people respond to those initiatives. From brain imaging technologies (fMRI) to measuring brain activities levels (EEG), these new technologies are enabling communication researchers and practitioners to have better understanding of physical and perceptual responses which may lead to attitude and behavioural changes in the intended communication audiences.

KEYWORDS: PUBLIC RELATIONS • COMMUNICATIONS MANAGEMENT • BEHAVIOURAL INSIGHTS • SOCIAL NEUROSCIENCE • MEASUREMENT.

Resumo

Os avanços na neurociência cognitiva e o mapeamento do cérebro humano oferecem grandes oportunidades para as áreas de relações públicas e de comunicações para começar a entender mais claramente como a narrativa de histórias, as mensagens estratégicas e as atividades de comunicação influenciam a percepção humana da confiança, credibilidade e autenticidade. Este ensaio fornece percepções das interconexões entre comunicações profissionais e de como as pessoas respondem a essas iniciativas. Desde as tecnologias de imagens cerebrais (fMRI – ressonância magnética funcional) até a medição de níveis de atividades cerebrais (EEG - eletroencefalograma), estas novas tecnologias estão permitindo que pesquisadores e profissionais da comunicação tenham melhor entendimento das respostas físicas e perceptivas que podem levar a mudanças atitudinais e comportamentais nas audiências de comunicação visadas.

PALAVRAS-CHAVE: RELAÇÕES PÚBLICAS • GESTÃO DE COMUNICAÇÕES • PERCEPÇÕES COMPORTAMENTAIS • NEUROCIÊNCIA SOCIAL • MENSURAÇÃO.

Resumen

Los avances en la neurociencia cognitiva y la cartografía del cérebro humano ofrecen grandes oportunidades para los campos de las relaciones públicas y de comunicaciones para comenzar a entender más claramente cómo la narración, las actividades de mensajería y comunicación estratégica influyen en la percepción humana de la confianza, la credibilidad y la autenticidad. Este ensayo proporciona informaciones detalladas sobre las percepciones de las interconexiones entre las comunicaciones profesionales y de cómo las personas responden a estas iniciativas. A partir de tecnologías de imágenes cerebrales (fMRI) para mensurar los niveles de las actividades cerebrales (EEG), estas nuevas tecnologías están permitiendo que los investigadores y los profesionales de la comunicación tengan mejor comprensión de las respuestas físicas y perceptuales de lo que puede conducir a cambios en la actitud y el comportamiento en las audiencias de comunicación visadas.

PALABRAS CLAVES: RELACIONES PÚBLICAS • GESTIÓN DE COMUNICACIONES • PERCEPCIONES COMPORTAMENTALES • NEUROCIENCIA SOCIAL • MENSURACIÓN.

Communicators in the public relations field aim to persuade meaningful changes in attitude or behaviour. While these changes may appear simple to an observer, the behind-the-scenes mental processing required to achieve these changes are complex (Cascio, Dal Cin & Falk, 2013). Many neural pathways and brain regions are involved to producing these changes. Advancements in neuroimaging provide a tool for untangling the intricate relations between brain functions, cognitions, and behaviour (Lee & Harris, 2013). Functional magnetic resonance imaging, or fMRI, measures specific activation in different areas of the brain based on oxygen levels in bloodflow. Techniques like electroencephalography and magnetoencephalography detect changes in electric and magnetic activity to provide a measure for brain activity. They enable researchers to compare models and theories with neural mechanisms, providing a more holistic and thorough understanding. Other technologies, like facial expression recognition, eye tracking, physiological responses, provide additional tools for evaluating response to communication (Lewinski, Fransen, and Tan, 2014). Communication neuroscience is invaluable to broadening our understanding of attitude and behaviour change, providing an additional perspective to all facets of communication (Falk, 2010).

NEUROMEASUREMENT AND COMMUNICATIONS

Researchers currently look for neuromarkers of social functions. Neuromarkers are distinct patterns of activation in the brain during various social behaviours. By observing the engagement and disengagement of different brain regions, researchers seek to tease out specific patterns associated with specific functions (Tognoli & Kelso, 2013). The goal is to eventually map out the dynamic brain patterns to better understand how the brain responses to stimuli and how these responses manifest in observable behaviour. However, mapping neural patterns is extremely complicated because different stimuli can elicit the same neural patterns and different neural patterns can produce similar behaviours (Tognoli & Kelso, 2013). Complicated social behaviours often involve many cognitive processes that share considerable overlap in neural activity (Ferebee & Davis, 2012). While neuroimaging has advanced at a staggering rate, it is still far from providing the detail and clarity needed. Further research in the field of cognitive neuroscience will provide the links between brain activation and cognitive processes, but the current state of understanding is still young in its ability to definitively map neural patterns to cognitions and behaviour. Despite all this, the field has made leaps and bounds in unraveling these complex processes.

Relying on self-report is a major limitation for research in communication and social cognition. The potential of neuroimaging lies in its ability to project a level of accuracy in evaluating responses to communication beyond self-report (Andrejevic, 2012). For example, EEG (electroencephalogram) can easily measure distraction and memory load during message processing (de Guinea, Titah & Leger, 2014). Neuroimaging also provides a direct look into the inner workings of neural processing that can be used to design more effective messages. By revealing how persuasion works, new insights gathered from this technology can teach communicators how to better influence thought and behaviour. Individuals respond to messages in different ways; understanding the underlying mechanisms allows communicators to cater messages and maximize effect (Vecchiato et al., 2012). With continuing growth in the field of neuroscience, more tools will emerge for behavioural prediction, validating behavioural measures, and investigating both unintended and intended effects of communication (Plassman, Ramsoy & Milosavljevic, 2012).

Despite its great potential, it is imperative to keep several caveats in mind when discussing neuroimaging techniques and the findings that emerge from them. Much of the research on the neural underpinnings of social behaviour relies on reverse inference (Plassmann, Ramsoy & Milosavljevic, 2012). Social behaviours are highly complex and can involve several different cognitive processes, with various networks of brain regions responsible for each process. Reverse inferences attributes brain activation present during particular tasks to be responsible for the responding behaviour, which can be problematic due to the considerable overlap in brain activity for various tasks. With something as intricate as the human mind, there are no simple causal mechanisms and no assumptions of causality should be made lightly from correlations (Kenning & Linzmajer, 2011). Given the complexity of the brain and our limited, though growing, understanding of the brain, conclusions made this way should be taken with some reservations, but allow excitement. Careful experimental design and statistical analysis can help address the problems of reverse inference. As imaging techniques and multivariate analysis methods develop, we will continue to make sense of the brain's role in communication. Researchers so far have laid a foundation for future research that both those in academia and industries should be aware of.

Using fMRI, Wang and associates (2013) examined the neurological correlates of behavioural impact following anti-tobacco messages, specifically comparing the relative value of message strength versus format quality. They found that the quality of the format, measured by the quality and quantity of audio and visual features, to only have an impact on smoking cessation when the message content was also strong, emphasizing the importance of having a well-developed message. Like Falk, Berkman, Whalen, and Lieberman (2011), they found activation of the dorsomedial prefrontal cortex to correlate with both reported intention to quit and post-message smoking cessation. Integrating neural activity information with self-reports of intentions and self-efficacy provided more accurate predictions for behaviour change than self-report alone, suggesting neural activity can account for variance in behaviour change beyond self-report of behavioural intent. These findings also have the potential to be applied in population level studies to predict responses to messages on a larger scale beyond the typically limited sample sizes found in this field of research. Using a neural focus group, Falk, Berkman and Lieberman (2012) predicted both individual and population behaviour in response to anti-smoking messages more accurately than self-reports. Cascio, Dal Cin and Falk (2013) found fMRI results from multiple brain regions, including the medial prefrontal cortex, to predict twenty-three percent of the variance in behaviour change beyond that of self-report. The prefrontal cortex serves as a hub for planning, decision making, and social behaviour (Barbet & Grafman, 2011). The ventrolateral area seems to be more active in response to successful persuasion, suggesting that it plays an important role in managing changes in mental frameworks (Falk et al., 2010).

NARRATIVE PERSUASION

By examining socio-cognitive theories like narrative persuasion through the lens of neuroscience, researchers can begin to understand the neural processing behind cognition. The amygdala processes emotional response, with the right lateralized side more heavily associated with imagery stimuli (Cook, Warren, Pajot, Schairer & Leunchter, 2011). Costa and associates (2010) used fMRI imaging while participants imagined narratives of different affect. Amygdala activation correlated with emotional arousal and interacted with the nucleus accumbens and medial prefrontal cortex of the reward pathway (Costa, Lang, Sabatinelli, Versace & Bradley, 2010; Wallentin et al., 2011). These findings connect the positive emotional experience of a narrative with positive reinforcement by the brain's reward circuitry. Considering that imagery contributes to transportation, which increases enjoyment and reduces resistance, the interaction between the amygdala and the reward pathway plays an important role in narrative persuasion. Identification is another major process by which narratives can reduce resistance to messages. Cheetham, Hanggi, and Jancke (2014) conducted an MRI study to compare individual differences in narrative identification experience with differences in brain structure. Their findings suggest identification to be associated with left hippocampal volume, dorsomedial prefrontal cortex volume, and the cortical thickness of the anterior insula. The hippocampus is known for its role in memory and simulation. Previous research points to the left side as being responsible for episodic memory, which the processing of narrative components would fall under (Cheetham, Hanggi & Jancke, 2014). It is also heavily involved in central processing of persuasive communication in general due to the importance of forming declarative memories of message evaluation. More peripheral attempts at persuasion, such as relying on communicator traits over message content, may not be as readily processed for memory (Cook, Warren, Pajot, Schairer & Leunchter, 2011). The prefronal cortex and insula, with several other regions, play important roles in processing empathy.

Empathy has two components, affective and cognitive. Affective empathy is the ability to share an emotional state with another individual, whereas cognitive empathy is the ability to understand another's emotional state (Flynn, 2016). Although both are often used in unison, they can act as separate, distinct processes (Kawamichi, Tanabe, Takahashi & Sadato, 2013). During narrative persuasion, cognitive empathy underlies identification, in which individuals assume the role of the characters. Being able to understand the character's emotional state is crucial for this. Sympathetic concern compels individuals to help others because of the positive emotional arousal when seeing others improve (Kawamichi, Tanabe, Takahashi & Sadato, 2013). Both forms of empathy are associated with activations of the caudate nucleus of the dorsal striatum, which plays a role in reward processing, and the insula, which is involved in perspective taking (Cheetham, Hanggi & Jancke, 2014; Stallen, Smidts & Sanfey, 2013). As a result, empathy is potentially an antecedent to trust. Wardle and associates (2013) found caudate nucleus activity in response to trust decisions based on reputation. Reduced insula activation in older adults to low trust situations could explain age differences in perceptions of trust (Castle et al., 2012). Social neuroscience can provide new insight by comparing individual differences in brain activity and comparing them with differences in characteristics like one's assessment of their own socioeconomic status. Ma, Wang and Han (2011) demonstrated how similar brain activity can produce different cognitions and resultant behaviour. Activity associated with empathic perception of pain in others predicted more donations in those who believed themselves to be of a high socioeconomic status, but fewer donations in those who believed themselves to be of a low socioeconomic status.

Reward processing plays an important role in persuasion (Flynn, 2015) because it rewards and reinforces actions that either change or maintain particular attitudes and beliefs. As a factor in evaluating communicator expertise, the ventral striatum activity is associated with increased valuation of expert advice over non-expert advice, predicting a reward for trusting another when expert opinion is valued greater than one's own (Kawamichi, Tanabe, Takahashi & Sadato, 2013). The orbitofrontal cortex then integrates information on expertise and opinion difference to be used in decision making (Meshi, Biele, Korn & Heekeren, 2012). These activations are associated with medial temporal lobe activity, which includes the hippocampus and parahippocampul gyrus for memory formation. This association may account for why messages from communicators with expertise are better remembered (Klucharaev, Smidts & Fernandex, 2008).

COGNITIVE RESISTANCE

Cognitive dissonance often opposes attempts to change attitudes, especially when they threaten or contradict currently held beliefs. Harmon-Jones and associates (2011) found the brain activity involved in resisting persuasion to be similar to that involved in response to classical dissonance manipulations where participants are told to lie about how interesting a passage is. This dissonance has been associated with activation of the dorsal anterior cingulate cortex, which is involved in emotional processing and stimuli response selection (Cook, Warren, Pajot, Schairer & Leunchter, 2011). Neuroimaging can not only identify areas associated with dissonance, but be used to provide support for cognitive models, such as the action-based model. This model suggests that dissonance elicits a negative emotional state that motivates actions for resolution. Based on EEG readings, areas involved in intention, planning, and commitment to decisions, are more active following dissonance (Harmon-Jones, Harmon-Jones, Serra & Gable, 2011).

Like other cognitive process, conformity is the complex accumulation of other tasks. To gather information from those in one's social group and integrate them as their own, it requires social information tracking, and cognitive control, both of which are associated with medial prefrontal cortex activation (Cascio, Dal Cin & Falk, 2013). Activation of the reward system promotes conformity through positive reinforce via ventral striatum and medial orbitofrontal cortex activation, which can be observed by both fMRI and EEG (Shestakova et al., 2013). Activation of the ventral medial prefrontal cortex can reflect a shift from outwardly presenting compliance with particular attitudes to personally accepting them (Izuma, 2013).

FINAL CONSIDERATIONS

While the research on social neuroscience may be too young to be applied in the way neuromarketing proposes, the future of this line of study is bright (Sebastian, 2014). Current research has already shown some power in predicting behavioural response to communication, demonstrating its potential for preliminary testing of messages and evaluating post-message response (Andrejevic, 2012). Although imaging techniques, like fMRI, are currently very costly to implement in industry, continuing advancements in the technology and literature will provide the tools for further research and developing other methods of assisting with communication. Neuroscience can be used to generate and test theories beyond the capabilities of traditional experimental design. By providing strong theoretical frameworks for processes like narrative persuasion (Flynn, 2015), communicators will be better equipped to persuade others (Flynn, 2016).

REFERENCES[1]

Andrejevic, M. (2012). Brain whisperers: cutting through the clutter with neuromarketing. *Somatechnics*, 2(2), 198-215.

Cascio, C. N., Dal Cin, S., & Falk, E. B. (2013). Health communications: predicting behavior change from the brain. *Social Neuroscience and Public Health* (pp. 57-71). Springer New York.

Castle, E., Eisenberger, N. I., Seeman, T. E., Moons, W. G., Boggero, I. A., Grinblatt, M. S., & Taylor, S. E. (2012). Neural and behavioral bases of age differences in perceptions of trust. *Proceedings of the National Academy of Sciences*, 109(51), 20848-20852.

Cheetham, M., Hänggi, J., & Jancke, L. (2014). Identifying with fictive characters: Structural brain correlates of the personality trait. *Social cognitive and affective neuroscience*.

Cook, I. A., Warren, C., Pajot, S. K., Schairer, D., & Leuchter, A. F. (2011). Regional brain activation with advertising images. *Journal of Neuroscience, Psychology, and Economics*, 4(3), 147.

Costa, V. D., Lang, P. J., Sabatinelli, D., Versace, F., & Bradley, M. M. (2010). Emotional imagery: assessing pleasure and arousal in the brain's reward circuitry. *Human brain mapping*, 31(9), 1446-1457.

1 References kept in the original presentation, according to the bibliographic norms adopted by the author. The same with respect to the citations in the text. – Referências mantidas no original, dentro das normas adotadas pelo autor. Idem para as citações no texto.

De Guinea, A. O., Titah, R., & Léger, P. M. (2014). Explicit and implicit antecedents of users' behavioral beliefs in information systems: a neuropsychological investigation. *Journal of Management Information Systems,* 30(4), 179-210.

Falk, E. B. (2010). Communication neuroscience as a tool for health psychologists. *Health Psychology*, 2010, 29(4), 355–357.

Falk, E. B., Berkman, E. T., & Lieberman, M. D. (2012). From neural responses to population behavior neural focus group predicts population-level media effects. *Psychological science*, 23(5), 439-445.

Falk, E. B., Berkman, E. T., Mann, T., Harrison, B., & Lieberman, M. D. (2010). Predicting persuasion-induced behavior change from the brain. *The Journal of Neuroscience,* 30(25), 8421-8424.

Falk, E. B., Berkman, E. T., Whalen, D., & Lieberman, M. D. (2011). Neural activity during health messaging predicts reductions in smoking above and beyond self-report. *Health Psychology*, 30(2), 177.

Falk, E., Rameson, L., Berkman, E., Liao, B., Kang, Y., Inagaki, T., & Lieberman, M. (2010). The neural correlates of persuasion: a common network across cultures and media. *Journal of Cognitive Neuroscience*, 22(11), 2447-2459.

Flynn, T. (2015). How narratives can reduce resistance and change attitutes: Insights from behavioral science can enhance public relations research and practice. Research Journal of the Institute for Public Relations, 2(2), 1-25. Available at http://www.instituteforpr.org/wp-content/uploads/Flynn.RJManuscript.8Nov2015-FORMATTED.pdf.

Flynn, T. (2016). You had me at hello: How personal, developmental and social characteristics influence communicator persuasiveness and effectiveness. Research Journal of the Institute for Public Relations, 3(1), 1-11. Available at http://www.instituteforpr. org/wp-content/uploads/Terry-Flynn-2.pdf.

Harmon-Jones, E., Harmon-Jones, C., Serra, R., & Gable, P. A. (2011). The effect of commitment on relative left frontal cortical activity: tests of the action-based model of dissonance. *Personality and Social Psychology Bulletin*, 37(3), 395-408.

Izuma, K. (2013). The neural basis of social influence and attitude change. *Current opinion in neurobiology*, 23(3), 456-462.

Kawamichi, H., Tanabe, H. C., Takahashi, H. K., & Sadato, N. (2013). Activation of the reward system during sympathetic concern is mediated by two types of empathy in a familiarity-dependent manner. *Social Neuroscience*, 8(1), 90-100.

Kenning, P., & Linzmajer, M. (2011). Consumer neuroscience: an overview of an emerging discipline with implications for consumer policy. *Journal für Verbraucherschutz und Lebensmittelsicherheit*, 6(1), 111-125.

Klucharev, V., Smidts, A., & Fernández, G. (2008). Brain mechanisms of persuasion: how 'expert power' modulates memory and attitudes. *Social Cognitive and Affective Neuroscience*, 3(4), 353-366.

Lee, V. K., & Harris, L. T. (2013). How social cognition can inform social decision making. *Frontiers in neuroscience*, 7.

Lewinski, P., Fransen, M. L., & Tan, E. S. (2014). Predicting advertising effectiveness by facial expressions in response to amusing persuasive stimuli. *Journal of Neuroscience, Psychology, and Economics*, 7(1), 1.

Ma, Y., Wang, C., & Han, S. (2011). Neural responses to perceived pain in others predict real-life monetary donations in different socioeconomic contexts. *NeuroImage*, 57(3), 1273-1280.

Plassmann, H., Ramsøy, T. Z., & Milosavljevic, M. (2012). Branding the brain: A critical review and outlook. *Journal of Consumer Psychology*, 22(1), 18-36.

Shestakova, A., Rieskamp, J., Tugin, S., Ossadtchi, A., Krutitskaya, J., & Klucharev, V. (2013). Electrophysiological precursors of social conformity. *Social Cognitive and Affective Neuroscience*, 8(7), 756-763.

Stallen, M., Smidts, A., & Sanfey, A. G. (2013). Peer influence: neural mechanisms underlying in-group conformity. *Frontiers in Human Neuroscience*, 7.

Tognoli, E., & Kelso, J. A. (2013). The coordination dynamics of social neuromarkers. *arXiv preprint arXiv:1310.7275*.

Vecchiato, G., Astolfi, L., De Vico Fallani, F., Toppi, J., Aloise, F., Bez, F., ... & Babiloni, F. (2011). On the use of EEG or MEG brain imaging tools in neuromarketing research. *Computational intelligence and neuroscience*, 2011, 3.

Wallentin, M., Nielsen, A. H., Vuust, P., Dohn, A., Roepstorff, A., & Lund, T. E. (2011). Amygdala and heart rate variability responses from listening to emotionally intense parts of a story. *Neuroimage*, 58(3), 963-973.

Wang, A. L., Ruparel, K., Loughead, J. W., Strasser, A. A., Blady, S. J., Lynch, K. G., ... & Langleben, D. D. (2013). Content matters: neuroimaging investigation of brain and behavioral impact of televised anti-tobacco public service announcements. T*he Journal of Neuroscience, 33*(17), 7420-7427.

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