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Introductory Chapter: (*trans*) Disciplinarity - A New Alliance between Sociology and Neuroscience

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and Sara Palermo*

1. Year 2021: the need for a new theoretical framework to understand social relations and the consequences on the individual's well-being

To begin any debate within a discipline, in our case applied neuroscience in the social sciences, it becomes important to start from the historical and conceptual reconstruction of the fundamental axioms and main paradigms. This is for a two-fold reason. First, because, the so-called “young sciences” are less and less accustomed to the culturally given element, thus moving more toward the “cognitive goal and advancement of knowledge” than toward the evaluation of the processes by which these goals are achieved. Second, because paradigm shifts, as well as changes in method and inference, lead to the abandonment of original concepts in favor of new ones derived from them more and more rapidly. Given the above, we believe it is important to revisit the historical and scientific value of concepts such as “attachment,” “adaptation,” “theory of mind,” “empathy,” “abandonment,” “social inclusion and exclusion,” and empathy. This need is expressed both from the point of view of the history of sociological thought, and from the point of view of the history of social sciences in general and, today, of social neuroscience. Today, we are going through a structural change in society, in which less and less direct contact (due to the software that allow us to interact) and the expression of emotions are no longer expressed in face-to-face relationships. The mediation of emotions, more and more often, takes place through a screen, rather than through intelligent software (AI), which, as a modern digital and immaterial appendage of our body, makes us part of the internet of things and (hyper-connected), even plus, part of the intrinsic mechanisms of the Internet of Things.

Social relationships are indispensable in the life of each individual and condition his way of thinking and his emotions. The individual, in fact, has a sort of interdependence with the social environment. However, social relationships are not always lived serenely or satisfactorily in a digitally unstructured environment, as these are often alienating contexts and able to produce vulnerability a progressive desertification of the individual's ego also for clinical settings [1, 2].

The massive use of social communication channels, in combination with the rise of virtual reality, becomes a central element of any critical reflection and research proposal. Human beings need social relationships. The evolutionary point of view suggests that group membership is a fundamental aspect of social life due to

survival. Disruption of social interactions predisposes to even more serious health risk factors when the disruption occurs because one is intentionally excluded from other people. This experience can cause an experience of severe psychological distress, in which strong negative emotions of sadness and depression, a high level of stress had expired ([3] p. 3).

Given the current scenarios—also secondary to the pandemic situation we are facing—and the digital drift that began a few years ago, concepts of abandonment, isolation, and empathy are back in vogue and increasingly central in prevention and intervention models.

As mentioned above, the pandemic has accentuated distances and isolation, and has led to seeking the relationship but mediated by the digital channel, bringing the dichotomous characteristics of “input” and “output” typical of computing to an extreme, especially in the fields of education and recreation. Education and leisure managed and experienced through ICT-IoT platforms are a common experience for all. Whether this experience is real and meaningful is another matter entirely. What are the consequences and the aftermath for the psychophysical well-being of the individual we are only just beginning to understand?

We deal with new learning and relational processes and new meeting places. The first suggestion in this regard comes from Prensky [4]: “we are living more and more in a world characterized by the man-machine.” Anyone who does not understand this and is not trying to find the new environment, whether they like it or not, is already left behind. “Adapting to the rapidly changing and technologically advanced new environment is one of the greatest challenges of our time. And this certainly applies to education as well”. Indeed, human interaction through new technologies necessarily implies an unnatural degree of “disincarnation” (which, as previously anticipated, favors, and supports the processes of ego desertification).

It is presumed that the main iatrogenic element of the relationship mediated by ICT-IoT platforms is the difficulty in making use of non-verbal communication indices. Not only gestures, facial expressions, and spontaneous posture, but also smells and vocal colors are lost in the confinement of the webcam. These are all key elements for the correct interpretation of communications, which lead from the denotation to the connotation of the message, and, consequently, to the rereading and interpretation of the implicit and affective aspects of the communication.

Several types of research in the social sciences and communication that the ability to understand and participate in these modes of interaction are a component of the human social experience (see, e.g., [5]) also in the difficult period [6]. Despite the possibility of synthesizing some emotional features, through emoticons and audio supports, bringing out some paraverbal aspect of human communication, it is still not possible to reach the totalizing experience of the real one, in person, face to face.

Human interactions are based not only on the exchange of information, but also on the implicit and affective methods of communication put in place. Emphasis, understanding, misunderstanding, interest, boredom, amazement, amusement, irony, compassion, and acceptance are based, at least in part, on non-verbal communication. Learning interactions that are mediated by telecommunication systems suffer from limitations in non-verbal modes of exchange that do not effectively support the communication of these pragmatic signals [7]. This observation led to the research and development of the ICT-IoT platform and digital application to support the exchange of affective information for online web learning. Researchers are examining the cultural and social changes that emerge from the interactions with new media, by the new knowledge in the field of cognitive science [8] and future studies of embodied cognition [9] may provide new insights regarding the effects of technological tools (i.e., Virtual Reality, VR) on the sense of “social presence” even in the area of education [10].

2. The road of neurosociology

We want to focus on how much the advancement of knowledge—and of the methods/processes for knowing—could lead to a better understanding of the typical concepts of the social sciences and psychology (such as abandonment, exclusion, and empathy), but also how each individual interprets and experiences these conditions. What will be increased within our reach will be understood as each empathizes with the other even before entering into verbal or gestural contact [11].

We argue with the possibility that to do this, the thin boundaries that divide the human sciences seek to make themselves permeable to each other with the utmost attention, reasonableness, and respect for the peculiarities of each. This (trans) disciplinary exchange can take place by recognizing the social and cultural factor as equal to the biological-ontological one: If it is true that at the base of the understanding of human relationships there are mirror neurons, it is equally true that culture and social environments influence mirror neurons and the evolution of the species (Turner, 2011).

Doing so could lead to the explanatory capacity of neurosociology, whose intent is to study social relations and socialization about the structures and functions of the nervous system. Importantly, neurosociology stands in close relation to neurobiology (and its branches) and social psychology. Thanks to this approach, methods, and intervention, strategies can be perfected in the areas of education, social distress, deviance, crime, health genesis, integration, and cooperation [12].

3. Neuroscience for social studies

“In my career as a sociologist, I first became interested in neurosociology around 1987, when a student lent me Michael Cazzaniga’s book *The Social Brain*. If the human brain was social, I thought that sociologists and their students should be the first to learn about it, not the last.”

This is how David D. Franks, Professor Emeritus of Sociology at the Department of Sociology at Virginia Commonwealth University, began to make the first considerations about the usefulness of social neuroscience in the sociological field and about the contribution that sociology could provide to neuroscience research and development. Franks is rightly credited with bridging the gap between sociology and neuroscience through a series of publications culminating in his *Handbook of Neurosociology* [13].

Neurosociology has the ambition to create a strong bridge between sociology and neuroscience where methods and knowledge of both disciplines can pass in two directions; but, above all, it is concerned with studying human interactions and socialization in relation to the social functions of the nervous system from a “clinical” point of view, that is, in a context of proximity between observer and observed and where there is involvement with the situations and facts on which the neurosociologist acts. Therefore, *neurosociology uses the knowledge of neuroscience to spread the “practical” aspects of sociology*, and in this perspective, we can frame it as a specialization of clinical sociology. The latter, in fact, aims to “intervene to change” “singular” situations, whether they are of an individual or a group or a community, an organization or an institution [14].

Considering social neuroscience tout court, it mostly inquires how evolutionary pressure has favored the emergence of the specialized social brain networks that allowed humans to build up complex societies. It has been shown, for example, that very basic behaviors such as cognitive processes underlying reward and punishment are influenced by higher-order variables such as social status and group membership.

These processes are also shown to be testable and valuable on specific clinical populations. In particular, social neuroscience has suggested an association between impulsive behaviors and altruistic punishment [15]. Just for an example, dopamine replacement treatment and dopamine-agonists in Parkinson's disease have been associated with impulse-control disorder and impulsive-compulsive behavior able to affect social decision-making [15–17]. With a transdisciplinary approach, it was possible to understand how “Frontal-executive dysfunction determines an alteration of social functioning through a mechanism of subversion of online action-monitoring, which associates disinhibition with volition. Genetic polymorphisms, alterations of the nigrostriatal substance, and impairment in the medial prefrontal cortex and in the Default mode network (DMN) seem to be able to explain these mechanisms” ([15], p. 1).

This demonstrates how our tendency to form groups based on dispositions, preferences, and ideologies can influence basic cognitive processes and—at the same time—how neurobiological and psychophysiological factors can modify social cognition and behaviors.

4. Conclusions

Digital Innovation is a very broad and transversal concept, and at the heart of all those technological, organizational, cultural, social, and creative changes that improve everyday life. In just two words: *Digital Transformation*. The evolution is continuous, not only in the technologies themselves, but also in the applications, in the communicative, relational, didactic-formative, and organizational models of groups and organizations.

Since the study of human relations and social reality can increasingly become transdisciplinary, inasmuch as the study of this subject is by its very nature interdisciplinary and transcends the often-artificial boundaries that separate and distinguish the various scientific disciplines. The advancement of ICT-IoT will allow us to create a new human-machine symbiosis that will improve the quality of life and the way we interact. Tending to this ultimate goal, the sciences will have to ally themselves to find the best models of fruition and adaptability of these new technologies to the psychological needs of human beings—with particular attention to the enhancement of empathic and identification processes. Neurosociology will allow us to keep up with the social, cultural, and economic changes we are going through.

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