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RESEARCH ARTICLE

Repercussions of The Development of Neuroscience in the Field of Psychology

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Abstract

Background: Neuroscience has made new combinations with the most different specialties, causing conceptual redefinitions and generating new fields that may or may not become new specialties. These are recombination efforts between specialties from different disciplines (and not between entire disciplinary fields), which face the challenge of working in an interdisciplinary way.

Objective: The purpose of the article is to answer the research problem: in the case of psychology, what consequences has neuroscience generated in its disciplinary territory?

Methods: Two hypotheses were formulated to answer the problem. One of them, internal to the discipline, proposes to investigate possible redefinitions around the concept of social cognition. And the other one, external, verifies the reception that psychologists have given to social neuroscience. Three journals from three different psychological specialties were chosen to carry out the investigation in the period from 2000 to 2023: the *Journal of Personality and Social Psychology*, representing social psychology, the *Journal of Cognitive Psychology*, cognitive psychology and the *Neuropsychology Review*, corresponding to the field of neuropsychology.

The systematic analysis technique was used to elaborate a search protocol from some strings.

Results: The two formulated hypotheses were not supported and, to account for this, some explanations were given, as well as new research hypotheses.

Conclusions: Among the repercussions generated by the development of neuroscience in psychology, it seems that the external repercussions are felt within the discipline in a more visible way than an internal repercussion such as the reformulation around the concept of social cognition.

Keywords: neuroscience, psychology, disciplines, interdisciplinarity

1. Introduction

Growing stimuli for interdisciplinary studies can be identified in the most various thematic areas such as obesity, poverty and public health, leisure studies and in emerging research such as nanotechnology and neuroscience (1).

Regarding neuroscience, the impact of its discoveries has drawn the attention of the most different fields of science. Former President George Bush even called the 1990s “the decade of the brain”.

Neuroscience has carried out new combinations of different specialties, causing conceptual redefinitions and generating new fields that may or may not become new specialties. These are recombination efforts between specialties from different disciplines (and not between entire disciplinary fields) facing the challenge of working in an interdisciplinary way.

As MacLead (2) rightly points out, when researching the specific domain of a specialty and its scientific practice, the hypothesis always arises that the specific or disciplinary domain of science can play a significant role in understanding why interdisciplinarity faces so many challenges.

Among the many challenges we might note the lack of knowledge on specific domain practices among those who are not familiar with the disciplinary field, conflicting epistemic values, and conceptual breadth (2). Among the challenges psychologists stepping into the field of neuroscience will face is that of mastering the conceptual vocabulary of the area of neuroscience with which they are interacting. Depending on the specialty in the field of psychology that the psychologist works in, this may prove more or less difficult. Social psychologists will make new combinations that are quite different from those proposed by neuropsychologists or cognitive psychologists, for example, because they are in areas that are more distant from neuroscience, when we think of conceptual vocabulary. Likewise, neuroscientists willing to interact with psychology specialties will face difficulties that are related to the type of specialty in which they work and the psychology specialty with which they want to interact.

As a disciplinary field, neuroscience has developed around two elements of its definition, as pointed out by Turner (3) and Weingart & Stehr, (4) in relation to the constitution and development of disciplines. It has been organized around its subject name, which has been shared and used and it has been structured in the sense of training people with the name of the subject, which therefore indicates the beginnings of a labor market and of students, fundamental conditions for the structuring of a discipline.

In Brazil, there are two baccalaureate courses in neuroscience: one at the Federal University of ABC, in São Paulo, and another one at the Pontifical Catholic University of Rio de Janeiro. There are also several postgraduate courses aimed at physicians, biologists, biomedical professionals, pharmacists, and psychologists. In the USA there are more than 100 bachelor's degrees in neuroscience and, in Europe, bachelor's degrees in neuroscience are offered in the cities of Essex, England as well as in Rotterdam and Amsterdam in the Netherlands.

As a field that develops recombination with specialties from the most different social sciences, neuroscience has received the attention of the most distinguished intellectuals who seek to characterize their interests, creating new terminologies by adding the prefix neuro: neuroeconomics, neurosociology, neuropsychology.

It is known that interdisciplinarity precedes or is a more fundamental phenomenon than disciplinarity. The organization of any academic unit, or of any research or training community, involves establishing a division of labor aimed at some set of proposals. The creation of protected internal subject markets for holders of specialized degrees is a logically and temporally subsequent step to the creation of divisions of labor (3).

The organization of disciplines into departments has a long history in universities and exemplifies, except for national differences, implying a more or less world-standardized form of organization (3).

Disciplines characterize different types of organizations, with relatively conventional collective interests that express common intellectual interests. Disciplines, as defended by Turner (3), are cartels that organize markets, for example, for the production and employment of students, excluding those who seek employment and who are not a product of the cartel. In this sense, it can be said that the more established a discipline is, the more strongly will its protectionist device act, which responds to changes in the market due to the actions of others.

Turner (3) states that there is a certain temptation to think of disciplines as nations, that is, as if they existed apart from their incarnations in states and therefore sometimes expressing themselves in the form of state and sometimes not. However, as he himself notes, in a way, this is a mistake. Disciplinization is the institutionalization of a phase of the process of division of intellectual labor. Some forms of this process become disciplines, others do not.

There is a difference between disciplinary and interdisciplinary efforts: interdisciplinarity creates new divisions of work in response to new

purposes. Regardless of how they begin, the disciplines, in the end, submit to the discipline of the protected internal markets they create (3-4).

2. One problem and two hypotheses to understand the effects caused by the presence of neuroscience in psychology.

Since the advent of social neuroscience, the incorporation of brain -based social cognition substrates has been constituted in a growing interest in understanding social development from the perspective of neurodevelopment. This, in a way, affects those disciplines that propose to study the psychological and social dimensions of human behavior. In the case of sociology, we identify the bonds that have been formed around the specialty called neurosociology (5). Nevertheless, in the case of psychology, what consequences has neuroscience generated in its disciplinary territory?

Schutt et al (6) even state that a biopsychosocial paradigm would be becoming a dominant perspective in medicine, psychiatry, and psychology, especially when neuroscience findings identify connections between neurological and social processes.

Schutt and al (6) see two repercussions in psychology: (a) one, external to the discipline, by which Cacioppo and Berntson (7) proposed the term social neuroscience, which is presented as an interdisciplinary specialty and already has a professional community expressing itself in its journal (*Social Neuroscience*) and in its professional association (*Society for Social Neuroscience*) and (b) one other, internal to the discipline, by which Fiske and Taylor (8) have reconceptualized the term social cognition as a binding between brain and culture.

Which psychology specialties would be more open to dialogue with neuroscience in the sense proposed by Schutt et al. (6)? Three specialties stand out. Psychology is an extensive disciplinary territory. In its professional association, the *American Psychological Association*, 52 divisions can be considered specialties. Several journals are linked to these divisions.

Cacioppo and Bernton (7) and others (9) see social psychology as a specialty that would tend to be interested in neuroscience research findings. In this sense, the renowned *Journal of Personality and Social Psychology* can be considered an important expression of this professional community.

A second specialty that would interact with and be open to welcome the discoveries of neuroscience is neuropsychology, a psychology specialty that investigates how a person's cognition and behavior are linked to the brain and the rest of

the nervous system. Neuropsychologists fundamentally address how injuries or diseases of the brain affect cognitive and behavioral functions. One of its journals, the *Neuropsychology Review*, can be seen as a vehicle for what the group of professionals who call themselves neuropsychologists think about neuroscience.

Lastly, a third specialty is the cognitive psychology. It can be understood as a study of "the various ways in which people perceive, why they remember some facts, forget others or why they learn a language" (10). The *Journal of Cognitive Psychology* is one of the vehicles that expresses what cognitive psychologists think.

Inspired by the hypothesis of Schut et al. (6) on the repercussions of neuroscience on the disciplinary field, two hypotheses were formulated to be verified in the three mentioned journals:

H1 – It is expected that more publications will be found addressing the reconceptualization of social cognition than references to social neuroscience in the three journals, since, as suggested by MacLead (2), there are more cognitive and institutional obstacles to interdisciplinary efforts than disciplinary ones. In disciplinary specialties, there are more refined controls to define who belongs and who does not belong to the area, and this is reflected in the types of discussions that will be less accepted in specialty journals.

H2 –According to Turner (3), one of the differences between disciplinary and interdisciplinary efforts is that interdisciplinarity creates divisions of labor in response to new objectives. This creates some obstacles for specialties from disciplinary fields that intend to interact. For example, the *Journal of Personality and Social Psychology* is linked to social psychology, a well-established specialty older than neuropsychology and cognitive psychology. Therefore, it can be hypothesized that we will find fewer hints of interdisciplinary efforts around social neuroscience or the concept of social cognition in the *Journal of Personality and Social Psychology* than in the *Neuropsychology Review* or the *Journal of Cognitive Psychology*.

3. Methodology

Some social scientists have serious restrictions concerning the use of the systematic review technique to collect bibliographic data. Among the most important restrictions, according to them, the lack of consensus among specialties in the social sciences stands out, unlike what happens in medicine and other areas that use this technique.

Bryman (11) proposes a set of five stages in the elaboration of a systematic analysis that might allow to overcome the mentioned restrictions:

1. Includes the definition of the outline and objective of the research, its protocol;
2. Refers to the selection of references (articles) relevant to the scope according to the research objectives. Many articles are not relevant and will be therefore discarded.
3. Evaluates the relevance of each article for the research objective, according to the location of the search strings, whether in keywords, abstracts.
4. Verification: Do articles address the influence of social neuroscience on psychology? Is it possible to identify suggestions to reformulate the concept of social cognition inspired by psychology in the three journals?

In the first stage, a protocol was created that defined the objectives and scope of the research. The objective was to investigate the presence of neuroscience in psychology through two concepts: (1) the concept of social neuroscience, as suggested by Cacioppo and Berntson (7); (2) the efforts to reformulate the concept of social cognition.

Three journals were chosen to carry out the verification: the first one, *Journal of Personality and Social Psychology*, is considered the most renowned one in the area of social psychology. There are other journals and, perhaps, verification in more than one journal would be more pertinent. Maybe, a less prestigious journal might be more open to this type of discussion. But, as an initial approach to the subject, it was decided to verify whether “neuroscientist” ideas are present in central areas of the discipline.

The second one, *Journal of Cognitive Psychology*, was chosen because of its easy access for a researcher based in Brazil, and also because it provided access to the *European Journal of Cognitive Psychology*. In a later stage, verifications in other journals, such as *Advances in Cognitive Psychology* and *Cognitive Psychology Review* would also be important to know if there are possible differences in the type of discussion and among the members of the cognitive psychologists' community who “frequent” one journal more than others.

Finally, the third journal, *Neuropsychology Review* was also chosen because it was more accessible than the *Journal of Neuropsychology*, for example. As was mentioned when referring to the other two journals, a broader survey should include other journals in the field of neuropsychology. But it is expected that, for an exploratory approach, the *Neuropsychology Review* can provide interesting

clues about the presence of neuroscience among its professionals.

Other psychology specialties could also be checked. The specialty of evolutionary psychology, for example, would be one of them, as it has thematic links with some of the central concerns of neuroscience. However, we chose not to include it in the survey because it is not much mentioned by social scientists who are interested in social neuroscience (5).

Stage 2 or phase 2 constitutes the search itself. Articles in English were searched for in the three journals from 2000 to the present. The search process was carried out without the use of filters, that is, title, abstract or keywords were not privileged. Two strings were searched for: “social neuroscience” and “social cognition”. As the term “social cognition” implies a broad and multifaceted concept and it results in an extremely high number of articles when used as an individual search string, it was decided that the term neuroscience should be added. Also, many of the articles found for “social cognition” did not satisfy the objectives of the research protocol.

The two search strings were verified in the three journals investigated on the following dates:

- (1) (social neuroscience) - *Journal of Personality and Social Psychology*, accessed on February 16, 2023 at 3 p.m.;
- (2) (social cognition) - *Journal of Personality and Social Psychology*, accessed on February 17, 2023, at 10:30 a.m.
- (3) (social neuroscience) - *Journal of Cognitive Psychology*, accessed on February 13, 2023, at 7:45 a.m.
- (4) (social cognition and neuroscience) - *Journal of Cognitive Psychology*, accessed on February 13, 2023, at 10 a.m.
- (5) (social neuroscience) - *Neuropsychology Review*, accessed on February 17, 2023, at 2 p.m.
- (6) (social cognition and neuroscience) - *Neuropsychology Review*, accessed on February 20, 2023, at 9 a.m.

4. Results

Findings are shown according to the hypotheses linked to them. Concerning H1 - It is expected to find more publications that address the reconceptualization of the concept of social cognition than references to social neuroscience in the three journals, since, as suggested by MacLead (2), there are more cognitive and institutional obstacles to interdisciplinary efforts than disciplinary ones.

Table 1: Phases 2, 3 e 4 of the Search Methodology

Journals	Search Strings					
	social neuroscience			social cognition and neuroscience		
	Phase 2	Phase 3	Phase 4	Phase 2	Phase 3	Phase 4
Neuropsychology Review	4	3	03	73	13	7
Journal of Personality and Social Psychology	13	7	7	43	11	7
Journal of Cognitive Psychology	69	3	2	28	26	3

Source: Prepared by the author (2023)

The list of references to of articles found for the two strings in phase 4 can be seen in Tables 2 and 3.

Table 2: Articles found in journals for the “social neuroscience” search string.

Journals	social neuroscience string
Neuropsychology Review	Bekkali et al (12) Campos et al (13) R* Chisholm et al (14)
Journal of Personality and Social Psychology	Chaves & Wagner (15) Burns et al (16) Bartholow et al (17) R* Beer et al (18) Cacioppo et al (19) R* Harmon-Jones & Devine (20) Willingham & Dunn (21) R*
Journal of Cognitive Psychology	Balconi & Molteni (22) Patil & Silani (23)

Source: Table prepared by author in February, 2023

* Repeated articles

Table 3: Articles found in journals for the “social cognition” And neuroscience search strings

Journals	social cognition And neuroscience search strings
Neuropsychology Review	Campos et al (13) - R* Van Den Stock et al (24) Palmer et al (25) Sheridan et al (26) Seabury & Cannon (27) Birch et al (28) Wittemberg et al (29)
Journal of Personality and Social Psychology	Izuma et al (30) Rule et al (31) Harmon-Jones et al (32) Bartholow et al (17) - R* Cacioppo et al (19) - R* Cunningham et al (33) Willingham & Dunn (21) - R*
Journal of Cognitive Psychology	Balconi & Molteni (22) - R* Patil & Silani (23) - R* Dolcos et al (34)

Source: Table prepared by author in February 2023

R* - Repeated Articles

Regarding H2 - we considered we would find fewer suggestions of interdisciplinary efforts around social neuroscience or the concept of social

cognition in the *Journal of Personality and Social Psychology* than in the *Neuropsychology Review* and *Journal of Cognitive Psychology*.

Table 4: Percentages of references to neuroscience found in three psychology journals in the period 2000-2023.

Journals	Strings	Social Cognition
	Social neuroscience	
<i>Journal of Personality and Social Psychology</i>	92,30% (12/13)	76,74% (33/43)
<i>Neuropsychology Review</i>	100,00% (4/4)	94,52% (69/73)
<i>Journal of Cognitive Psychology</i>	78,26% (54/69)	61,38% 16/26

Source: Prepared by the author (2023)

5. Discussion

Regarding H1, although the 69 articles found by the “social neuroscience” search string give the impression that a high proportion of references are occurring in the *Journal of Cognitive Psychology* compared to efforts around the concept of social cognition, the number is illusory, as few articles mention the term social neuroscience in the abstract or in the text. Therefore, if we consider this data, phase 2, of the first registration of the articles found and phase 4, of the articles finally selected, we have more articles in the two phases for the social cognition search string.

The term “social cognition” needs to be considered as a broad and common concept in the discipline of psychology in general and in areas such as cognitive psychology in particular. But, anyway, H1 deserves to be further explored. Suggestions for revising the concept of social cognition were found based on neuroscience instruments (22, 23, 34).

Balconi & Molteni (22) argue that some findings on social neuroscience would be important to study emotions. They use NIRS (Near-infrared spectroscopy) to do functional neuroimaging. They state that this method can be used to study interaction between two people and investigate signs of brain activity during cooperation activities, comparing them with competition activities. According to Balconi & Molteni (22), the use of NIRS suggests a new class of neurobiological markers that can be used to diagnose disorders related to social cognition.

The article by Balconi & Molteni (22) appears in the *Journal of Cognitive Psychology* both for the social neuroscience and social cognition search strings. Several other articles mention the importance of using neuroimaging and/or NIRS as an important technique in social neuroscience (16, 18-19, 21, 30-31,33).

H1 postulates that it is expected to find more publications that address the reconceptualization of social cognition than references to social neuroscience in the three journals, since, as suggested by MacLead (2), there are more cognitive and institutional obstacles to interdisciplinary efforts than disciplinary ones. However, that was not the case.

In fact, there are more references to social neuroscience in the sense that it would make an important contribution to psychology. The *Journal of Personality and Social Psychology* had a special section in its 2003 volume 85, number 84 to present the promises of social neuroscience. Harmon-Jones & Devine (20) present five articles that raise theoretical and methodological issues, according to social neuroscience (35-36).

Cacioppo et al. (19) mention other initiatives in the sense of opening spaces for social neuroscience, such as the creation of a section in the *Journal of Cognitive Neuroscience*. Therefore, there are no elements that support H1 in the three journals investigated.

Even the articles that discuss how modern imaging techniques can help to better understand mental disorders such as schizophrenia (13,25) do not postulate a redefinition of the concept of social cognition.

H2 hypothesizes that fewer suggestions of interdisciplinary efforts would be found around the notion of social neuroscience or the concept of social cognition in the *Journal of Personality and Social Psychology* than in the *Neuropsychology Review* and *Journal of Cognitive Psychology*.

The journal of the field of social psychology (*Journal of Personality and Social Psychology*), being the most renowned one on a more central and ancient specialty of psychology, would tend to present more resistance to interdisciplinary invitations than journals of less central specialties.

As shown in Table 4, there is a high number of references to neuroscience are in the three investigated journals. The *Journal of Personality and Social Psychology* has more references than the *Journal of Cognitive Psychology* and fewer than the *Neuropsychology Review*.

The presence of neuroscience can be considered significant in all three journals, as there are very few articles that do not mention it. In the *Journal of Personality and Social Psychology*, regarding the “social cognition” search string, 19

articles, out of 43 identified articles, only mention neuroscience in the bibliography, while another 18 make reference to it in the body of the text and keywords. On the other hand, in relation to the “social neuroscience” search string, references are more frequent, as out of the 13 articles found, only 2 do not mention neuroscience in the body of the text. It must be considered that there was a special issue with articles devoted to the contribution of social neuroscience to psychology in this journal.

Table 5: Presence of the term neuroscience in the body of articles, according to search strings.

Journals	Search strings	
	social neuroscience	social cognition
Journal of Personality and Social Psychology	84,61% (11/13)	41,86% (18/43)
Neuropsychology Review	75% (3/4)	24,65% (18/73)
Journal of Cognitive Psychology	8,69% (6/69)	10,71% (03/28)

Source: Prepared by the author (2023)

As shown in Table 5, the presence of the term neuroscience in the body of the articles was more recurrent in the *Journal of Personality and Social Psychology* than in the other two journals in relation to the two search strings. That is, the presence of neuroscience in the articles of the *Journal of Personality and Social Psychology* is more significant than what H2 postulates.

The low presence of the term neuroscience in the body of articles in the *Journal of Cognitive Psychology* compared to other journals is noteworthy. The specialty of cognitive psychology,

according to the hypothesis of Schut et al. (6), would theoretically be a specialty with an interest in neuroscience discoveries. Table 6 shows that the presence of the term neuroscience in the bibliography of articles is more significant. Why does this presence in the bibliography not translate into presence in the body of articles? In explanatory terms, can one think of a rivalry between some explanations from neuroscience and cognitive psychology? This is a question to be further investigated.

Table 6: Presence of the term “neuroscience” in the bibliography and in the body of articles in the *Journal of Cognitive Psychology*

Position in the article	Search strings	
	social neuroscience	Social cognition
Bibliography	52/69	16/28
Text body	6/69	03/28

Source: Prepared by the author (2023)

6. Final considerations

Among the repercussions generated by the development of neuroscience in psychology, according to Schut et al (6), it seems that the external repercussions are felt within the discipline in a more visible way than an internal repercussion such as the reformulation around the concept of social cognition.

Survey limitations may have produced a bias. Because of the fact that the investigation was based on only one journal for each specialty, it may be the case that the chosen journal is not

representative of what the community of psychologists in that specialty thinks. In this sense, a survey with more journals and, perhaps, more specialties, may be interesting.

Anyway, the *Journal of Personality and Social Psychology* suggests that there are good openings for interaction between areas of social psychology and neuroscience. Franks (37) sees an enormous potential for cross-fertilization between the disciplinary fields of sociology and neuroscience and points to social psychology as one of the specialties that would most benefit from this

dialogue. Perhaps we should investigate this hypothesis further by researching the field of social psychology.

Can the expansion of neuroscience and its entry into psychology specialties go against the interests of these specialties? The social process of interaction and development of specialties from interdisciplinary recombinations is a process of cooperation, competition and conflicts regarding disciplinary interests and resources. Could the low

reference to the term neuroscience in the body of articles in the *Journal of Cognitive Psychology* indicate resistance from cognitive psychologists in this sense? This work cannot answer this question and cannot state what the conflicting interests and resources between psychology and neuroscience specialties are, nor what these specialties are. An investigation into cognitive psychology can be a good start to clarify these questions.

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