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## Autonomy and the ambiguity of biological rationalities: systems theory, ADHD and Kant

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### ABSTRACT

We present a theoretical review of notions of autonomy to show how they organize discourses within social sciences around the biological reality of ideal self-regulating individuals. First, we reconstruct key meanings of autonomy in biological theory, focusing on theories of autopoietic systems and their connections to constructivist epistemologies in the social sciences. Second, we discuss developmental and neuropsychological theories of self-regulation, demonstrating conceptual links with biological and systems theory. Third, we discuss the implications for education, using the case of attention deficit hyperactivity disorder as an example on how the construction of the biological, as the natural foundation of individuality, is intensified by the ideal integration of individuals as self-regulated agents. We argue that autonomy, theoretically rooted in modern philosophy, and expanded through system theory to biological and social sciences, has become a biopolitical project contributing to contemporary biological rationalities that produce the educated subject.

### KEYWORDS

Autonomy; attention deficit hyperactivity disorder; biopolitics; individuality; self-regulation; systems theory

Researchers from different disciplines have presented concerns about how arguments for biological and neuroscientific explanations of particular phenomena in school settings require a critical conversation. One of the concerns when biological insights lead to explanations of a lack of motivation or low school achievement, with no connection to social and cultural insights, is the re-inscription of discourses about the normal. When teachers and other school professionals respond to students' social behaviour that they deem problematic (e.g. hyperactivity, lack of concentration, weakness of executive functions, lack of motivation), they are faced with 'the challenge of responding appropriately in a context in which the nature of the difficulty and its causes are often not clear or at least ambiguous' (Daniels, MacLure, & Youdell, 2015, p. 787). Generally, the course of action and institutional ways to 'solve the problem' appeal to biomedical knowledge in order to justify specialist intervention. While the discourse of diagnosis is constructed as a potentially equalizing practice, it does not address challenges derived from inequalities in learning opportunities (Davies, 2013; Harwood & Allan, 2014). Behaviour self-regulation, institutional responses and scientific research are politically intertwined processes.

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In this paper we argue that the notion of autonomy (from the Greek αὐτόνομος: ‘auto’, self; ‘nomos’, law), as linked to the ideal of a subject that rules itself, accounts for human individuals’ capacity to preserve power over their bodies as a way to conduct themselves with unity and self-determination. Our thesis is that mutations in the concept of autonomy from Kant onwards, with systems theory emerging as a transdisciplinary expansion and diversification of this concept in biological and social sciences, feed contemporary discourses of self-regulation inhabiting sociology, psychology and education. We focus, first, on the connection between constructivist epistemologies in the social sciences and the concept of autonomy in biological theory; second, on the philosophical roots of contemporary self-regulation theory in neuropsychological research; and third, by discussing the attention deficit hyperactivity disorder (ADHD) controversy as an exemplary case, we demonstrate how new neuropsychological discourses inspired by the idea of individual autonomy as self-regulation in development have an impact in education. We discuss these connections following conceptual paths among discourses, rather than their chronological order, thus going back and forth through different periods from the eighteenth century to the present.

### **Drifts of biological autonomy: from systems theory to constructivism**

As early as the nineteenth century, sociology took the notion of organization from biology, thinking of societies as evolving organisms composed of diverse organs that must maintain solidarity with the whole organismic process. Organization entails dynamic relationships between different structures that are hierarchically arranged at different levels. Systems theory during the twentieth century developed the notion that, in order for a living being to maintain its unity against the background of the multiplicity of parts, levels and processes, it should imply keeping the organization (Mayr, 1982; Rosenberg, 1985). This means, on the one hand, that living beings actively deal with disorganization and avoid potential dissolution in the environment. Organization, then, is what preserves the unity or individuality of an organism. On the other hand, organisms deal with their own multiplicity, maintaining different structures within a unique totality. Organization means self-governance over multiple local operations in order to make them work together for one global end, thus emerging as an operational unity. As such, self-organization can be defined as ‘the process by which individual subunits achieve, through their cooperative interactions, states characterized by new, emergent properties transcending the properties of their constitutive parts’ (Schweitzer, 1997, p. 21). Self-organizing units are sets whose unity emerges through the constant subordination of parts into a coordinated whole. This is the idea of a system: not a manifold of operations but an emergent unity specified by a field of operational autonomy.

Late developments in systems theory place further emphasis on the relationship between autonomy and unity. For instance, Maturana (1981) and Varela (1979) define living beings as units that produce themselves, materially making components and borders in order to continue their existence as units. The concept of autopoiesis means that a cell is a living being as long as it generates its own organelles, instead of importing them from the environment. It takes energy from the environment but transforms it according to its own law, as only living beings can do. The ancient Greeks believed that plants absorb nutrients selectively, according to their own constitution and history.

Autopoiesis means operational closure. The elements of a system can only be produced by the system, and the system produces only its elements. Living beings –

are systems that are defined as unities as networks of productions of components that recursively, through their interactions, generate and realize the network that produces them and constitute, in the space in which they exist, the boundaries of the network as components that participate in the realization of the network. (Maturana, 1981, p. 21)

As open systems that exchange energy with the environment, living beings are paradoxically closed to their environment regarding their components and organization, in the sense that whatever operation takes place within it is produced by, and for, itself. Therefore, system closure is equivalent to system autonomy. According to Maturana and Varela, autopoiesis is the specific way in which living beings achieve autonomy. In other words, autopoiesis is a particular type of autonomy; the latter applies to not only cells and meta-cellular organisms but also non-living systems, as well as human organisms and social systems.

For social scientists within late systems theory, however, autopoiesis is not a particular type of autonomy that applies only to living beings, but rather a general definition of operationally closed systems such as cells, brains and societies. According to Luhmann (1990), psychic and social systems also produce their components. Here, psychic and social systems are conceived not as living systems but as parts of the environment of the latter, as psychic and social systems are, in each case, part of the environment of the other. If autopoiesis is the strongest form of autonomy, in generalizing the latter from biological to social systems, the condition of autonomy (closure) is kept as an invariant across different types of system organized at different levels. Moreover, autonomy is specifically linked to the very individuality of a system, not to its independence or its freedom. It is possible to define the ‘individuality of individuals as autopoiesis’ (Luhmann, 1990, p. 116), because the process of production of the material components of the system that maintain it as a unified unit yields an individuation process that is supported in a selective differentiation from the environment.

Another consequence of operational closure, which is another name for autonomy, is the epistemological implication that knowledge is always a selective simplification of the environment as part of the process of producing knowledge for the system and within itself. Radical constructivism (Von Foerster, 2003) has been an influential epistemological theory in the social sciences, from which other constructivist theories of cognition and scientific knowledge were derived, or renewed, by taking this reference to the biological basis of autopoiesis as a kind of scientific foundation. Beyond their differences, these theories apply the principle of autonomy to cognition, stating that our knowledge starts with the information given by the environment but organizes itself according to the observer’s organization and self-production process. The constructivist axiom, according to which we can only perceive what our structure enables us to perceive, has become a scientific commonplace in the field of psychology.

### **Micro-politics of self-regulation: from psychology back to Kant**

Within the social sciences, self-organizational system theories have been extremely influential in theories about several social, psychological and cultural phenomena (Caporaël,

1997; Eiser, 1994; Makishima, 2001), in addition to the generation or strengthening of diverse socially focused constructivist epistemologies (Gergen, 2009; Heider, 1958; Potter & Wetherell, 1987). A case worthy of attention is the reception of biological theories of autonomy in psychological and neurocognitive research, due to the practical impact of neuropsychological scientific discourse in workplaces, health centres and schools. Indeed, the construction of biological reality in the social sciences, especially developmental and personality theories, elaborates on another feature of autonomy that links it to the art and techniques of the administration, control and conduct of oneself.

Organizational and constructivist accounts of developmental and pathological processes focus on a specific feature of autonomous behaviour: self-organization also entails the capability of the organism to manage the operation of different levels in different time scales – in other words, the self-regulation of behaviour. The basic assumption of this notion is that all organisms are ‘centers of regulation’ (Polanyi, 1958) and sources of selective operation to cohesively and purposively direct behaviour towards internal needs. The self of self-regulation is conceived as a master subject that knows that his or her action is autonomously initiated. Self-organization of behaviour implies not only the production of action in a coordinated and controlled way, but also the tendency of the agent to govern its flow and also move away from heteronomous regulation or control. An autonomous agent not only produces but also projects itself in order to increase autonomy or realize it optimally (Ryan, Kuhl, & Deci, 1997). Autonomy is a biologically rooted potential of humans, to be elaborated and developed, and dependent upon biological and social conditions for its optimal expression. It is argued that the notion of self-regulation is implied by biological autonomy, and human self-regulation is developed from the biological tendency of all living beings to coordinate, extend and integrate functioning.

These authors argue that the acquisition of self-regulatory abilities is critical for adaptive functioning, so that ‘disruptions of self-regulation’ located in organic or social processes are implicated in the aetiology of a wide range of psychopathologies and have a cascading effect on subsequent development. In line with a multi-level approach, it is argued that autonomy is realized through the integration of different levels of analysis, from the neurobiological bases of self-regulation to ever-changing cultural demands. Integration implies the alignment of social, neurobiological and evolutionary processes within which the regulation of behaviour takes place. In this scheme, self-regulation involves a coordination of the upwards and downwards causation among different hierarchically arranged levels, so that social conditions might influence the acquired motivation of the individual, which have a top-down effect on the functioning of the neurobiological components on which such motivation depends. Such a model of the multi-level assemblage of structures helps these authors to ‘explicate the multiple levels of support required for optimal development of autonomy, as well as the multiple pathways by which the disturbance of autonomy contributes to psychopathology’ (Ryan et al., 1997, p. 706).

Following the conclusions of attachment research studies, these authors note that autonomy support points towards a more active integration of parental values and regulations, and a greater experience of autonomy. To do so, specific kinds of parental style are required. Disruptions of self-regulation within these ‘entangled hierarchies’ (Luhmann, 1990, p. 8) may express themselves in clinical phenomena such as obsessive

compulsive disorders or schizophrenia, or in behavioural problems such as bulimia, which may involve an experience of being driven by forces beyond personal control, including symptoms of controlled regulation, alienation, self-infiltration and unwanted ruminations (Kuhl & Beckmann, 1994). According to their reasoning, autonomy-supportive parenting presumably 'involves participation of right-hemispheric cortical and sub-cortical systems that participate in global, tonic emotional modulation' (Ryan et al., 1997, p. 719), assuming that these brain structures are 'the functional locus of executive or coordinating functions that would be necessary to autonomous regulation' (p. 717), as well as 'the locus of operation of holistic self-representations' (p. 718) necessary to regulate behaviour according to motives and standards integrated in the self. The complex connections among the social processes of a group, the neurobiological structures of the species and the executive, emotional and cognitive functions of the individual are meant to work together for optimal development. Autonomy is, then, not only a general explicative principle but also an ideal, correlated with the ideal society that the authors assume: 'A stable social organization is one whose members have fully assimilated its rules and guidelines and who therefore experience transmitted social practices as autonomous activities' (p. 716).

Even though the biological concept of autonomy has been the subject of intensive study since World War II, with the contributions of cybernetics and system theories, the idea that living beings have an inner organization that allows them to differentiate themselves from the environment and to coordinate several units as a whole, is as old as the philosophy of life. At the time of the theoretical developments of both Rousseau and Kant, moral, political and cognitive autonomy were associated with freedom and rational understanding. Thus, an autonomous subject was understood as one who thinks for him/herself and acts according to his/her own law. Likewise, an autonomous society is one that rules itself, instead of being subjected to nature or other political forces. Although for Kant and Rousseau autonomy was not a biological condition, but rather the hallmark of human adults, this capacity has to be developed from childhood, formed from the natural endowment of mankind. As it is, autonomy is not a given fact but a challenge and an achievement: it must be produced through the development of natural self-interest attributed to individuals and preserved by positing it as a condition that makes it possible for them to enact themselves.

Kant is the main philosophical source of constructivist theories of knowledge. He elaborated the principle of autonomy, albeit not in connection with concepts such as systems and autopoiesis. However, we suggest that his work made possible the development of such concepts through a straightforward path. Kant (1999) argued that knowledge is only possible as the organization of material according to the knower's organization. Moreover, autonomy is an assumption and an ideal of modern subjectivity. For example, Kant's conception of the Enlightenment urge 'Dare to know!' (*Sapere aude.*) 'Have the courage to use your own understanding', is therefore the motto of the enlightenment (Kant, 1991). Not only did he argue that knowledge is configured by the structure of knowing subjects, and that modern humanity (man at the age of majority or independence) must develop in accordance with its own rationality, but in his work on judgment (Kant, 1929) he also anticipated the notion of systems in his treatment of the concept of organisms and the living form (Weber & Varela, 2002).

Kant's metaphysical elucidation of purpose stemmed, of course, from his previous considerations about ... some major advances in the life sciences, such as in descriptive embryology or comparative anatomy. (Huneman, 2007, p. 1)

Moreover, in his elaboration on practical reason, and especially the relationship between moral autonomy and the realm of ends, Kant (2011) equated autonomous action with intrinsically self-regulated acceptance of the very principle of autonomy of individual subjects: to be an autonomous citizen means to follow the universal law that stems from rationality, whereas to follow any contingent or particular imperative means not to be free. Freedom is at the core of autonomy. Paradoxically, however, Kant's argument also implies that to be free is to subject oneself to a universal, non-contingent, and thus necessary, law, namely, the law of individual autonomy.

### **Biopolitics of self-regulation: from 'neurocultures' to the ADHD debate**

The theoretical discussions presented above on the biological and philosophical roots of autonomy and the ideal of self-regulation are relevant today in the context of new forms of biomedical knowledge offering justifications for social and cultural 'problems' in school policies and practices. These 'new biological rationalities' refer to the ways in which biomedical discourses are intertwined with social practices and scientific knowledge. Conceptualizations of autonomy within social and psychological sciences underpin attempts to give cultural practices a biological ground, particularly through related notions such as system and self-regulation. Many authors (Daniels et al., 2015; Davies, 2013; Fitzgerald & Callard, 2015; Gillborn, 1992, 2006, 2008, 2010; Rasmussen, 2006) envision the weight that biological science conclusions are gaining, and their impact on policy agendas, relates, in particular, to issues of discrimination, diversity and inclusion (Gillborn, 2016; O'Connell, 2015; Rose, 2007; Youdell, 2010). Bio-determinism, 'neurocentrism' (Pitts-Taylor, 2010), or what others have called 'neurocultures' (Schmitz & Höppner, 2014, p. 195), 'under-developed understandings of the body, movement and gesture, and cognitivist assumptions of human/behavioral rationality' (Béhague & Lézé, 2015, p. 254), are based on the idea that 'the brain is conceived as foundational of many aspects of human nature and social life and where the ability to know key truths about the self and the social are dependent upon developments in neuroscience' (Pitts-Taylor, 2010, p. 635). In this sense, it has been claimed that there is a shift taking place whereby exclusionary practices in schools are being transformed to inclusionary ones, based on a bio-power that –

entails one or more truth discourses about the 'vital' character of living human beings; an array of authorities considered competent to speak that truth; strategies for intervention upon collective existence in the name of life and health; and modes of subjectification, in which individuals work on themselves in the name of individual or collective life or health. (Rabinow & Rose, 2006, p. 195)

Consequently, more children are said to manifest mental, cognitive or behavioural diagnoses. Some of these new biological rationalities are specifically inspired by the idea of autonomy, a widely accepted principle connecting philosophical, social and psychological discourses about subjects and development. We now turn to a concrete case, ADHD, to provide an example of how this discourse on autonomy and self-regulation takes both form and action.

The ADHD debate focuses on the problem of biological determination (Lamperd, 2009). Interestingly enough, at the beginning of the 2000s, the natural sciences were generally agreed that justification of the neurological, or natural, determination of this phenomenon was neither worth, nor requiring, further effort (Barkley et al., 2002). Within the field of social sciences there are those who strongly criticize and counter the biological determination of the disorder, even claiming on the more extreme side that ADHD is a mere fiction, whose only purpose is to validate and generate discourses of 'lacking' (to read more on these discussions, see Clarke, Mamo, Fishman, Shim, & Fosket, 2003; Conrad, 2007; and Rose, 2007). This performative attribute of ADHD discourses is inspired on Michel Foucault's various works (Foucault & Lagrange, 2006; Foucault, Martin, Gutman, & Hutton, 1988; Foucault, Senellart, & Collège de France 2010; Foucault, Ewald, Fontana, Davidson, & Burchell, 2012) on the operations of power, knowledge and self-discipline in the production of the subject. From this point of view, biological accounts of ADHD are presented as specific means to legitimate certain practices of inclusion and exclusion to maintain particular social hierarchies and cultural arrangements. As such, the ADHD disorder has a critical location within the grid of differentiation of normal or deficient. Its authority to name and justify knowledge and practices, mainly based on biology and neuroscience discourses, ensures that ADHD is a failure in the execution of the self-regulation process, which can be interpreted as a failure in the realization of autonomy and which would be indicative of an error at the level of neurological development (Bailey, 2009; Bianchi, 2016). Following this critique of ADHD discourses, based on a structuralist interpretation of Foucault, biology is represented as expert knowledge that dictates the position of a subject diagnosed with ADHD as disruptive, as a failure, as a subject with no capacity to organize him/herself in order to perform as an efficient citizen, then the demand for autonomy operates at an individual level with no reference to either the environment or context (Bianchi, 2010; Leavy, 2013). This is important because it locates the interpretations for educational failure within students' attitudes and behaviour, which means redirecting the pedagogical activity to a managerial one. More importantly, as ADHD is biologically understood as a set of norms to define specific fitting and non-fitting subjects, the production of those 'risks' that allow early diagnosis or prevention usually comes from 'cultural contexts'. As such, 'race', gender and disability are established as 'risk factors', which become intertwined in interpretations of children's behaviour to the extent that diagnosis becomes inevitable (Bailey, 2009).

The Foucaultian perspective does not provide a more complex or satisfactory explanation of the relation between the cultural and natural aspects of the subject; and, in particular, the biological is excluded from the discussion at first hand, only being taken into consideration for the effect that power and discourse have over it (e.g. Comstock, 2011; Visser & Zenib, 2009). Therefore, the biological dimension in the social sciences is muted and deprived of its cognoscibility: is understood as a condition of possibility for the social dimension, but simultaneously it is taken as a given, as an irreducible a priori that cannot be determined, remaining mysterious and ultimately unknowable. From both sides, then, the biological dimension remains under-conceptualized and appears to be implicitly understood as an abstract ideal (Keller, 2014).

The example of ADHD illustrates how behaviour and subjectivity can be understood in terms of individual self-regulation capabilities and failures framed by the ideal of autonomy. But it also shows, in conjunction with the conceptualizations about autonomy in the previous sections, that the biological explanation of self-regulation practices and the discursive construction of individual reality, are two incommensurable perspectives on the problem of ‘determination’ (the idea of autonomy). The ADHD debate is shaped by tension and complicity between constructivist and systemic co-productions of culture as the ‘post-biological’ organization of social practices, and of nature as the ‘pre-social’ individuality of living subjects. The idea of autonomy underpins both the structuralist critique of self-regulation biopolitics and the neurological foundation of self-regulation orthodoxy and pedagogy, reconstituting and multiplying the Kantian separation (determination) of knowledge and existence. Implications of this deep and problematic influence are not only theoretical. Our discussion on autonomy and self-regulation directs the attention to the effects of the production of a biological subject within the social sciences, psychology and education to explain failures and slippages when the expectation is regularity and performance. The weight given to biological explanations maintains the idea that ‘normal seems prior to abnormal’ (Rose & Abi-Rached, 2013, p. 204). Autonomy and self-regulation may work as critical milestones to justify the biopolitical project to produce the ideal subject, much beyond the remit of the ADHD debate.

### **Discussion: historical resonances and philosophical commitments**

The notions of autonomy are internally troubled, and fuelled, by the question about the continuities and discontinuities between the social and the biological. Some authors (e.g. Luhmann, 1990; Maturana, 1981; Rosenberg, 1985; Varela, 1979) claim that autonomy is an invariant feature of living beings. Others (e.g. Kant, 2011; Polanyi, 1958; Rousseau, 1997; Ryan et al., 1997) state that it refers to the gap between mere biological existence and a fully human life. Our aim is not to solve this paradox but rather to show the implications of such ambiguous articulations between biological existence and full human life. Because of the strong relations between autonomy and individuality in biological theory, human autonomy is posited as an ideal that applies to individual bodies. Already, the political autonomy of a community is supposed to be founded in the autonomous participation in, and acceptance of, the general will. Borrowing from biological theory, the social sciences built a notion of autonomy characterized by individuality, unity and closure. Moreover, the fact that autonomy is not given or granted, but rather produced and developed, helps researchers from different fields to think of autonomy as a somewhat general explanatory principle, even an ideal of life and development. Human beings are, tend to be, or ought to be, individual, unitary, coherent, integrated, self-referential, self-regulated, well-adjusted and well-coordinated. Within the emergence of new biological rationalities, a specific notion of the biological subject has been constructed during recent decades within the social sciences, psychology and education, around a rather paradoxical principle of autonomy.

Moreover, autonomy is a problematic concept strongly implicated in a too-modern tradition about education and socialization that goes back to Rousseau – perhaps a first attempt to solve the problem of the difference between nature and culture and the modern ideal of the subject. As we have argued, the notion of autonomy, not only from

the biological point of view, but also in philosophy, sociology and psychology, is strongly linked to the notion of system, that is, of self-organizing sets. The idea of system, as an emergent unity specified by a field of operational autonomy, also implies the ideal of an effective micro-politics of a self-mastered subject. Such is the problem of autonomy, and such is the biopolitics of self-management. However, our reconstruction of the problem of autonomy draws on diverse faces or moments, disclosing inner connections across different historical frames, disciplines and concepts. This leads us to question whether we are talking about new or old biological rationalities, or new scientific forms of old political projects.

In *We Have Never Been Modern*, Latour (2012) explored the conditions that sustain the difference between nature and culture provided by Robert Boyle and Thomas Hobbes in the seventeenth century. Latour recognizes a common construction among these scientific approaches to physical and political reality: both present an ontology of purification and a method for dividing what is, and what is not, human. Scientific analysis is meant to purify the hybrids. Within this project, Kant provided a century later the first universal formula for the difference between pure and empirical knowledge. The modernist effort to establish a neat separation between nature and culture, however, always works alongside its opposite, namely, the problem of translation between them and the proliferation of hybrid realities (Deleuze, 1994).

Jean J. Rousseau aimed to bridge nature and culture by understanding the hybrid singularity of human existence in civil life. The education of autonomy was proposed, then, as the missing link of the modernist project. In Rousseau's *Social Contract* (1997), the transitions between force-based and moral-based authority require a third moment, that of the *civitas* or the *polis*, a properly human space involving the recognition of both the natural (passions) and cultural (beliefs) dimensions as intrinsic components of the human citizen. Civil life is the only space in which human beings can live with autonomy from the compulsion of passions and the coerciveness of beliefs, and where the difference between nature and culture is therefore constantly troubled. In Rousseau's *Emile* (1979), such a path between nature and culture is thought of as the process of socializing subjectivization that constantly transforms natural beings into political subjects. This transition to autonomy is the principle of both the biographical trajectory of individuals and the history of humanity. Thus, human autonomy is only possible through the permanent transition and recombination of nature and culture.

We do not suggest that Rousseau is a radical alternative to Kant, but rather his inspiration. Autonomy, the desired link between nature and culture, is an idea producing concepts such as system and construction that seem to be reproducing the Kantian incommensurability between existence and knowledge in the very effort toward a promised or presupposed reunion. It is within this theoretical matrix that contemporary concepts of autonomy in psychology and education are meant to account for the assemblage of nature and culture, with the potential reduction of human beings to individual entities, unitary systems or self-managing brains, through the micro-politics and biopolitics of self-regulation.

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