

On semiotics and subjectivity: a response to Tony Brown’s “signifying ‘students’, ‘teachers’, and ‘mathematics’: a reading of a special issue”

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Abstract In this response we address some of the significant issues that Tony Brown raised in his analysis and critique of the Special Issue of *Educational Studies in Mathematics* on “Semiotic perspectives in mathematics education” (Sáenz-Ludlow & Presmeg, *Educational Studies in Mathematics* 61(1–2), 2006). Among these issues are conceptualizations of subjectivity and the notion that particular readings of Peircean and Vygotskian semiotics may limit the ways that authors define key actors or elements in mathematics education, namely students, teachers and the nature of mathematics. To deepen the conversation, we comment on Brown’s approach and explore the theoretical apparatus of Jacques Lacan that informs Brown’s discourse. We show some of the intrinsic limitations of the Lacanian idea of subjectivity that permeates Brown’s insightful analysis and conclude with a suggestion about some possible lines of research in mathematics education.

Keywords Culture · Community of thinkers · Lacan · Marx · Objectification · Peirce · Semiotics · Subjectivity · Synechism · Vygotsky

A language where the subject is excluded ... is today an experience that comes into sight in different points of culture... the being of language appears to itself only as it entails the disappearance of the subject. How are we to have access to this strange relationship? (Foucault 1994, pp. 548–549; originally published in 1966)

1 A thoughtful and thought-provoking critique

We are appreciative of the deep thought that Tony Brown has given to the Special Issue (SI) on semiotics. In his article, he has raised issues concerning some of the strengths and

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limitations of contemporary uses of Peircean and Vygotskian semiotics in mathematics education research—in particular as these interpretations relate to concepts of self and subjectivity. To analyze the articles, Brown resorted to Lacan’s psychiatric theory, developed in the early 1950s, and endeavored to uncover to what extent the articles of the SI denounce that which, in the Lacanian spirit, appears to be the unavoidably repressive classroom language of education regimes. Carried out in this way, Brown’s exercise could not but end up in a sort of disappointment. As he wrote, most of the analyses conducted by the SI authors privilege “relevance to classroom actions at the level of interaction rather than the wider social parameters that govern those actions and define the actuality of classrooms.” From this point of view, the analyses often give the impression of “nudging individuals towards conventional, that is, state sanctioned modes of behavior.”

Brown’s stimulating article opens up interesting interrogations concerning the manner in which the problem of subjectivity should be understood in its cultural context. His use of Lacan’s theory in mathematics education is certainly an innovative move (see Brown 2008). However, this raises the same methodological difficulties that Brown pointed out concerning the use of Peirce’s work: as Brown noted, Peirce was writing in a different context and historical milieu, with a particular agenda. But so was Lacan. Contemporary discourses that attempt to transplant Peirce’s (or Lacan’s for that matter) original ideas without taking into account the social and cultural frames in which the ideas were developed cannot adequately address their current problems.

Brown acknowledges that some of the authors in the SI have modified the analytical frames used by Peirce by cross-pollinating them with other theoretical perspectives. However, there are still potential pitfalls, and the Lacanian perspective introduced by Brown—although suffering from the same methodological difficulties that he finds in the SI articles—is nonetheless fruitful in deepening the conversation.

Thus, in the spirit of academic debate, in this article, we offer some comments on Brown’s thoughtful critique. In the first part, we comment on Brown’s inquiry and its theoretical background. In the second part, to better understand Brown’s analysis, we offer a brief critical appraisal of Lacan’s concept of the subject and its underlying idea of culture. After pinpointing some of the limitations of Brown’s Lacanian approach, we suggest a more comprehensive perspective with which to theorize the self and subjectivity in education in general and mathematics education in particular. We conclude with a suggestion about some possible lines of research in mathematics education.

2 Brown’s inquiry and its theoretical background

Brown posited the goal of his paper as follows:

In this paper I seek to better understand how conceptions of subjectivity are intentionally or unintentionally produced through the way in which the authors depict research objects such as “students”, “teachers” and “mathematics”. Yet in using the term “intention” I am cognizant of how this term has faltered as a result of hermeneutic interrogation. (Brown, this issue)

This goal has to be understood against the background of a view according to which discourses create their own objects. As a result, research objects such as “the self”, “students” and “teachers” are not *objects in themselves*, but products of discourse, “more or less illusory conceptions ... set against the complex backdrop of multiple ideologies.” (Brown, this issue).

Brown's goal is positioned within the great insight that marked the peak of self-awareness of modern thought—an insight clearly formulated by Freud in his claim that it is not the individual who produces her/himself, rather she/he is the product of a symbolic order. This symbolic order is theorized by Lacan (considered Freud's most notorious disciple) as the order of culture. Referring to the role of cultural languages in the development of the child, Lacan wrote as follows: "language, with its structure, exists prior to each subject's entry into it at a certain moment in his mental development" (Lacan 2006, p. 413). He continued, "And the subject ... is the slave of a discourse in the universal movement of which his place is already inscribed at his birth" (Lacan 2006, p. 414). Drawing on these ideas, Brown reminds us that an important task for mathematics education is to remain vigilant about the oppressive nature of discourse and the concomitant cultural technologies of control. It is against this Lacanian background that he states the spirit of his reading of the SI: "I seek to pinpoint", he says, "how the authors understand the building of control technology that would enable the consequences of their research to be realised" (Brown, this issue).

Although indisputably laudable, Brown's reminder becomes quickly entangled in a narrow concept of culture that, unfortunately, limits the import of his comments and distorts the intentions of the authors. Indeed, although Brown rightly noted that a particular discourse cannot be separated from an implied theoretical positioning, it becomes apparent, as the critique unfolds, that the usage of terms such as "intentions" and "meanings", mentioned in the goal of his article, is itself positioned in a particular Lacanian interpretive discourse, ignoring the intentions of the authors and imposing its own frame of reference on their meanings and concerns. As a result, the authors' voices are assimilated into a pre-established system of significations, ending up in the form of oppression that Brown's critique strove to denounce in the first place.¹

To better understand Brown's critique, let us turn to the sources from which he draws his concept of culture and subjectivity.

3 Lacan

Jacques Lacan's major work, *Écrits*, appeared in 1966—a key year in the history of modern thought. Indeed, it was in 1966 that Michel Foucault also published *Les mots et les choses*. Both works dealt with the same topic: the death of the subject.

The death of the subject articulates, in the most clear and comprehensive way, an idea of Freud's: it deals with the awareness that we are products of socio-historical structures, thereby putting an end to the idea of the autonomous self promoted by Enlightenment philosophers (such as Kant and Locke) according to which we are the product of our own deeds and actions. Of course, Freud's main idea can be found in Marx's *Theses on Feuerbach*, where Marx affirms that human essence "is the ensemble of the social relations" (Marx & Engels 1968, p. 29). This idea also appears in a more elaborated version in the *Economic and philosophical manuscripts of 1844*, where Marx wrote as follows:

The individual *is the social being*. His life—even if it may not appear in the direct form of a *communal life* in association with others—is therefore an expression and

¹ In fact, one reviewer of an earlier draft of his manuscript apparently questioned the integrity of this approach, calling it an "ethical violation"—perhaps in the spirit of the symbolic violence described by Bourdieu 1995—see Brown's first footnote.

confirmation of *social life*. Man's individual and species-life are not *different*, however much—and this is inevitable—the mode of existence of the individual is a more *particular*; or more *general* mode of the life of the species, or the life of the species is a more particular or more *general* individual life. (Marx 1844/1964, p. 138)

The difference is that, for Freud and Lacan, in contrast to Marx, the individual's relationship to culture is seen as the end of a glorious dream—the dream of the self-making individual. This is why the subjectivity portrayed by Lacan is an agonizing and essentially alienated one. As Brown notes, “subjects are alienated from *their* discourse” (Brown, this issue; emphasis in the original; see also Brown 2008, p. 233 & 238). In fact, from Lacan's point of view, individuals are seen as without discourse. They arrive at a world already plagued by various discourses that are not theirs. Thus, “The subject, in his or her alienation, is obliged to express herself and be understood through externally imposed linguistic filters” (Brown, this issue).

Lacan's concept of subjectivity rests on a neat—but inoperable—separation between the individual and her/his culture. For Lacan, there is something like a realm of wants and wishes that the individual would like to express, “genuine” pre-linguistic wants. But the individual lacks the language to express them. She/he then has to resort to the cultural languages around her/him (the Lacanian Symbolic dimension), just to find out that there is none that fits what is to be expressed. The individual then has no other choice but to use the cultural languages which transfigure her/his primal intentions. It is only in the mirror stage that the infant can find some comfort, by identifying her/himself to her/his own image, “in which the *I* is precipitated in a primordial form, prior to being objectified in the dialectic of identification with the other, and before language restores to it, in the universal, its function as subject” (Lacan 2006, p. 76). But the image that the child finds in the mirror is barely comforting, since, as Lacan noticed, it does not reflect the scrutinizing subject but its mere exteriority, her/his own *Gestalt* (Lacan 2006, p. 76). Rather than a vehicle for growing into culture and society and becoming a cultural being, language is the trap in which the individual becomes a colonized one. As one of the most important contemporary Lacanian scholars puts it, “For Lacan, language is a gift as dangerous to humanity as the horse was to the Trojans: it offers itself to our use free of charge, but once we accept it, it colonizes us” (Žižek 2006, pp. 11–12).

This view is true only to the extent that the subject is conceptualized in a particular way in its relationship to culture. It is a view that portrays the subject as continuously walking on the verge of a dangerous precipice: to her/his left there is the internal world of her/his primal genuine wants; to the right, there is the external world of culture and its unavoidably alienating languages and laws. This is an errand subject, who, to survive, has to self-extract her/himself continuously from culture, a subject living 24/7 on the watch, to realize that this is impossible, for as Lacan remarked “absolute awakening would be equivalent to death” (Leupin 2004, p. 45). The verge of this precipice is most revealing in Lacan's reconceptualization of Saussure's idea of the sign. Lacan introduced the following symbolism:

$$\frac{S}{s} = s'$$

The bar separating the signifier *S* and the signified *s* is not a fraction sign, but the sign of an unbridgeable topological border that differentiates the Symbolic and the Imaginary orders. The signifier *S* relates to language or culture or, to use Lacan's term, to the Law (Lacan 1986), which for Lacan (and Brown) amounts to *repressive* Law. The term *s* relates to the imaginary—those non-genuine transfigured primordial desires generated by identification and other substituting mechanisms, “the immense variety of objects that the drives may choose to substitute for the first, prohibited, and lost object that is the mother”

(Leupin 2004, p. 10). It is the realm of fictitious wanting, for “‘What I want’ has already been imposed on me by the patriarchal order that tells me what to desire” (Žižek 2006, p. 39). The terms *s'* is the realm of the Real (which for Lacan is the realm of meaning or the truth of our desire and the unconscious).

From this perspective, the subject hence appears as a lonely wanting being confronted with a world of choices where, to her/his dismay, there is in fact nothing from which to choose: Neither objects, for objects are merely projections along the lines of the imaginary vector, representations of frustration and desire; nor actions, for these are, in the end, actions tainted with unconscious desires and fantasies repressed by the Law and its castrating prohibitions. This is why, “the pretense to objectivity is very often a means of repression of the singular unconscious desires that motivate our choice of a particular object” (Leupin 2004, p. 8).

In short, the subjectivity that is delineated by Lacanian discourse is one of a subject driven by a primordial drive for possession (symbolized in the possession of the mother) that finds her/himself in a world full of objects that she/he wants but cannot possess, as they are subsumed in the web of others' languages and practices. To utter a word to attend to the desired objects is already to play other people's game, not one's *own* game. To enter into discourse is to cross a forbidden gate and enter the unbearable exiling march towards the land of culture, where there is no money to buy one's own freedom. It is an extremely individualistic subjectivity that perhaps very well encapsulates the disenchantment of capitalism. It might not be by chance that Lacan gladly uses Mallarmé's metaphor of language—the metaphor where language is compared to money: something that we do not possess but just see passing through our hands.²

Inspired by these ideas, Brown searches through the articles of the Special Issue, looking for traces of denunciations of the oppressions of culture, indexes of how educational policy repressively operates through teachers and students and *forces* them to cross the aforementioned forbidden gate. The teacher is portrayed either as a naïve instrument of the omnipresent oppressing symbolic system whose actions are aimed at nudging individuals towards sanctioned modes of behavior or towards becoming uncritical practitioners; the teacher is a kind of empty self, following policy documents and “policy framework” in an unreflective manner. In both cases, the teachers' and students' actions are seen as forms of compliance, as servile alliance to an oppressive regime. The problem with this line of thought is twofold.

First, it is cast on dubious generalizations. We do agree with Brown that cultures and their varied discourses (mathematical, political, etc.) can become oppressive. One of the authors of this paper grew up in a meticulously repressive political and economic apparatus designed by the CIA to keep absolute and terrifying control over a small country, and hence knows very well what terror, control and repression are about. But Brown's filtering lenses are used incautiously, without taking into account the nuances and cultural differences on which each one of the authors of the SI operates, acts and thinks.

Second, and most importantly, to deal with the question of subjectivity, Brown resorted to too narrow a conception of culture. The idea of subjectivity conveyed by Brown is based on the Lacanian idea of the subject of a psychoanalytic apparatus and its discourse, that is to say, an agonizing subject trying to survive in the midst of a variety of cultural languages none of which allow the subject to feel at home; a Kafkaesque subject alienated by strangulating systems and their cold impersonal rules. This makes for a kind of desperate

² Language is like the “exchange of a coin whose obverse and reverse no longer bear but eroded faces, and which people pass from hand to hand” (Lacan 2006, p. 209).

being living at the paradoxical juncture of a system of discourses from which she/he cannot escape and that are, against her/his will, second after second, producing her/him.

Subjectivity, Brown is right, cannot be understood without its relationship to culture. But, from an educational viewpoint, we think, there are more encompassing and promising ways in which to theorize such a relationship than the Lacanian one in which he sought support. It is our contention that the idea of subjectivity cannot be conceived of only in terms of either a glorious and martyring opposition to social structures or a submissive compliance with governmental regimes. In the next section, we explore the idea of subjectivity using a Vygotskian sociocultural approach.

4 Subjectivity in a historical–sociocultural approach

Marx's philosophy is an attempt at creating a framework for understanding and action against oppressive forces. It is a reaction against the legendary German idealism and the sociopolitical powers of his time. Like Lacan, he was worried by the increasingly alienating cultural structures that were hunting and threatening individuals. In the societies of his time, he found coercive mechanisms directed at perfecting the worker and degrading the human. However, in contrast to the French psychiatrist, he conceived of the individual as capable of overcoming these problems. For Marx, language is not necessarily the colonizing instrument of culture, the worst experience men and women could endure. On the contrary, for Marx, language is the bridge to culture and the Other: language, Marx says “*is practical consciousness that exists also for other men, and for that reason alone it really exists for me personally as well*” (Marx 1846/1970, p. 51). Marx's conception of language as something that is “*from the beginning a social product*” (Marx 1846/1970, p. 51) does not necessarily amount to estrangement and alienation. For language can *genuinely* mediate individuals' *labour*.

Labour, indeed, is a practical and epistemological category for Marx, and his conception of language cannot be divorced from it. Labor, that is to say, practical and theoretical activity mediated by language, is the *link* between individuals and their culture and between individuals themselves—the practical source of what it is to be human (Osborne 2005). Hence, Marx here takes a different route than the more contemplative one followed by Lacan, for whom, in the beginning, was the *word*—or the *verb*, as he used to say, quoting the Apostle John and coining the term *parlêtre*, to refer to the subject as an amalgamation of *parler* (to talk) and *être* (to be) (see Schwall 1997). For Marx, in the beginning, was the *deed*, the transformative action of our cultural world. This is why Marx could assert that “*The production of ideas, of conceptions, of consciousness, is ... directly interwoven with the material activity and the material intercourse of men, the language of real life*” (Marx 1846/1970, p. 47). In the course of cultural development, consciousness emancipates itself from the concrete world and proceeds to the formation of “*pure*” theory, theology, philosophy, mathematics, ethics, etc. These accomplishments are not purely theoretical, as Marx noted in the *German Ideology*. They transform our own ways of thinking—an idea that Vygotsky was to pursue many years later: “*men, developing their material production and their material intercourse, alter, along with this their real existence, their thinking and the products of their thinking*” (Marx 1846/1970, p. 47).³

³ In a famous paper, “*The instrumental method in psychology*”, Vygotsky wrote: “*By being included in the process of behavior, the psychological tool [language, signs, etc.] alters the entire flow and structure of mental functions. It does this by determining the structure of a new instrumental act just as a technical tool alters the process of a natural adaptation by determining the form of labor operations*” (Vygotsky 1981, p. 137).

This last quotation reveals Marx's concept of the individual as a historical and cultural being. But this historical being is not conceptualized as merely produced by historically formed structures. For Marx and the ensuing Vygotskian sociocultural approaches, there is a reciprocal influence without which *change* (this elementary principle of Marxist dialectical thinking) would be simply impossible. Indeed, in the same way that it is impossible to understand practices without paying attention to the affording structures in which they take place, it is impossible to understand how structures are reproduced and modified except *through the investigation of the individuals that live within them and modify them*; for, as Donham (1999, p. 53) rightly remarked, "after all, structures do not act".

Of course, Marx was well aware of the fact that cultures are non-homogeneous complex entities and that the production of ideas is always entangled with questions of power. Contemporary socioculturalists have also emphasized this intrinsically conflicting nature of cultures, as they are crossed through and through by webs of power created and mobilized by subjectivities holding different and often conflicting views—something which the Russian literary critic Mikhail Bakhtin (1981) termed heteroglossia:

The concept of heteroglossia recognizes the multiple dimensions of cultural life and is, therefore, an important corrective to static, unified conceptions of culture. It legitimates difference of opinion and restores for theorists the individual's voice in the creation of their cultural patterns. In this view, culture is seen not as a superorganic entity demanding obedience; rather, it is a world full of unique individuals, each expressing personal views within their cultural interactions. (Quantz & O'Connor 1988, p. 96)

We see, hence, that sociocultural approaches posit the problem of subjectivity in such a way that the individual is not conceptualized as intrinsically and unavoidably alienated by talking other people's language. There is room for making the historical languages inscribed in the culture in which we live and act our own. For as Fay notes,

Agents, not mere objects, are "enculturated" (or, more accurately, "engage in the process of enculturation"). Agents not only draw on cultural beliefs, rules, and values to form their intentions and enact their projects, but through their activity culture itself is reconstituted. That is, culture is not only the ground of human activity but is the outcome of this activity as well. (Fay 1996, p. 57)

Our march towards culture—our own inscription into the historically constituted process of the ever-changing cultural practices and their discourses—can, however, become alienating. At certain times, romantic as he was, Marx saw the overcoming of alienation in the individual's capability to treasure and master her/his own sovereignty. But, as mentioned earlier, he also offered other more interesting hints as to how to conceptualize the idea of the overcoming of alienation, and saw it through the relationship between the individual and her/his labour or activity (Dupré 1966, 1983; Fromm 1961). According to this view, alienation appears when the link between the individual *qua* individual and her/his sociocultural activity is broken, that is to say, when the individual feels *estranged* from social labour and others.

Transposed into educational terms, these ideas mean that the central role of education is not really to arm students and teachers with weapons with which to go to war against the malicious omnipresent control mechanisms of governmental regimes that would be continuously trying to reduce subjectivities to compliance and conformity. The central educational role is, as we see it, to offer a space to *reflect* and *engage critically* with the social practices, discourses and ideologies that we encounter in our march towards culture and our life in it.

The march towards culture has been thematized by one of us as a process of *objectification*. As mentioned earlier, for Lacan, objectification is the illusory attempt of a subject to reach something that is alienating under the premise that what is to be objectified is not *hers/his*. It is merely a transfigured *desire*—my primordial intention perverted in the language of the Other. In the sociocultural line of thought discussed here, objectification appears rather as the individual's meaningful *labour* in her/his attempt at becoming conversant with, and critically positioned in, sociocultural practices and their discourses. Learning rests on an attitude of open-mindedness: it is a reflective, critical opening movement towards others and the objects of culture:

[O]bjectification thus is more than the connection of the two classical epistemological poles, subject and object: it is in fact a transformative and creative process between these two poles, where, in the course of learning, the subject objectifies cultural knowledge and, in so doing, finds itself objectified in a reflective move that can be termed *subjectification*. The making of the subject, the creation of a particular (and unique) subjectivity is thus a process of subjectification that is made possible by the activity in which objectification takes place, and by the *re-reflective* nature of thinking and the possibilities that e.g. language and other cultural instruments of thought offer to distinguish between an “I” and the “Other” ... This is why learning is both a process of knowing and a process of becoming. (Radford 2008b)

Sociocultural approaches of this sort plead for a conception of subjectivity and the self that goes beyond the ahistorical individualism inherited from the Enlightenment and the disenchanting Lacanian discourse. Instead of the self-exiled subject of the latter, what is emphasized here is a concept of the autonomous person that is sensitive to the importance of history, the context and others, and where autonomy is both self-fulfilment and social commitment (Radford 2008a).

Bearing these ideas in mind, let us now come back to one of the insightful comments made by Brown mentioned in our introduction—the delicate integration of Peirce's ideas in contemporary educational research.

5 A rationale for regarding Peirce's accomplishments from a contemporary point of view

With regard to the point that it is fruitful, in fact necessary, to assess Peirce's theoretical formulations in the light of contemporary theory—in the context of mathematics education and its research today—there is a warrant for such a stance in Peirce's own writing. As Presmeg (2003) has pointed out, many of Peirce's thoughts concerning the community and its role in human knowledge were expressed in his earlier writings in the context of his concern with the relative merits of nominalism and realism. On the one hand, he defined nominalism as a form of individualism, “the doctrine that nothing is general but names; ... common nouns represent in their generality nothing in the real things, but are mere conveniences for speaking of many things at once” (Peirce 1992, p. xxiv). Realism, on the other hand, holds that “the essences of natural classes have some mode of being in the real things” (Peirce 1992, p. xxiv). Peirce espoused an *ideal-realism* in the later evolution of his thought, which related to his views on the community:

Though the question of realism and nominalism has its roots in the technicalities of logic, its branches reach about our life. The question whether the *genus homo* has any

existence except as individuals, is the question whether there is anything of any more dignity, worth, and importance than individual happiness, individual aspirations, and individual life. Whether men really have anything in common, so that the *community* is to be considered as an end in itself, and if so, what the relative value of the two factors is, is the most fundamental practical question in regard to every public institution the constitution of which we have it in our power to influence. (Peirce 1992, p. 105; his emphasis)

According to this view, the role of community in the public institution of mathematics education is an issue of fundamental practical importance. The significance of the community of thinkers in the evolution of all knowledge, including that in the field of mathematics education, is indicated in Peirce's somewhat negative designation of the individual—uninformed by the sociocultural milieu—as ignorant and in error. If psychology is the study of individual cognition, then Brown is right that Peirce was not particularly concerned with psychology as such, despite his designation of the importance of individuals in constituting the community, as in the foregoing quotation. However, his view of the role of the community is captured in his principle of *synechism*, which provides a warrant for assessing with hindsight his writings in another sociocultural era and regarding their potential usefulness in contemporary contexts of mathematics education. Continuity is central in Peirce's definition of *synechism* as “the tendency to regard continuity ... as an idea of prime importance in philosophy” (Peirce 1992, p. 313). *Synechism* involves the startling notion that knowledge in its real essence depends on *future* thought and how it will evolve in the community of thinkers:

Finally, as what anything really is, is what it may finally come to be known to be in the ideal state of complete information, so that reality depends on the ultimate decision of the community; so thought is what it is, only by virtue of its addressing a future thought which is in its value as thought identical with it, though more developed. In this way, the existence of thought now, depends on what is to be hereafter; so that it has only a potential existence, dependent on the future thought of the community. (Peirce 1992, pp. 54–55)

Whether “the ideal state of complete information” is ever an attainable goal, is a matter of doubt, particularly in light of the Lacanian frame introduced by Brown, but the relevance of *synechism* for the current context lies in the role attributed to future generations of thinkers in assessing the achievements of the past and present. These considerations provide a warrant, not only for Brown's criticism of writings that take Peirce's frames literally and apply them to contemporary mathematics education, but also provide a warrant for critiquing Peirce's notions in themselves, because of the principle of *synechism*. Thus Peirce himself provides support for a critique such as Brown has undertaken. It is significant that there is some degree of resonance on this point, between the lenses of phenomenology and psychiatric Lacanian theory that Brown espouses and the pragmatic philosophical position of Peirce: but these are theories that differ substantially in other ways.

6 Synthesis and suggestions for future research

In a recent paper that invokes the perspectives of Lacan more deeply, Brown (2008) defines subjectivities as “effects of organic discursive networks” in which mathematical objects (along with all symbolic objects) are situated as historically evolving phenomena. However, subjectivity, we have argued, is much more than the byproduct of the functional discursive

participation of individuals: subjectivity is bound up with the historically evolving social practices where individuals live, act, interact, reflect and resist the unavoidable effects of power and ideologies. Brown suggests that Lacanian theory transcends the debate (e.g., Confrey 1994, 1995) about the compatibility of theories based on Piaget's stages of individual learning (albeit embedded in social interaction) and Vygotskian sociocultural theory that stresses the primacy of social and historical factors. The tension between a view of mathematical objects as either constructed or inherited was characterized as a "key difficulty for mathematics education researchers" (Brown 1997, p. 9). However, as implied in the previous sections, we have cast doubts concerning the success of Lacanian theory, on the grounds of the narcissistic conceptualization that it offers of the individual and the poor account that it provides of alterity, i.e., the individual's relationship to the Other (see e.g. Lacan 1973, 1986). Lacanian theory of subjectivity appears haunted by the shortcomings of individualism that, in the end, it is incapable of overcoming. We certainly agree with Brown (this issue) that "Mathematics education research deals with individuals, social groups and social systems, so consequently needs a variety of apparatus that enables analysis to span variously conceived domains." Unfortunately, we are still not convinced of the educational potential of the Lacanian insights that he brings along with his critique. As already mentioned, the Lacanian idea of subjectivity seems to be of little import in education as a result of the shortcomings of Lacan's agonizing and intrinsically alienated concept of the self and subjectivity. The Freudian idea of the individual that is but the product of language that served as a starting point to Lacan's theorizations has received more interesting thematizations in the work of other thinkers, such as Foucault. Instead of considering, as Lacan did, the individual as locked out and cut off from her/his culture and condemned, as it were, to live the errant life of a ghost that carries out an intractable existence, caught up between the worlds of the symbolic and the imaginary, without power and means to change her/his life and that of others, Foucault, like Marx and contemporary post-structuralist Marxists (Goldstein 2005), advocated an idea of subjectivity where resistance and transformation of social conditions were the sources of ethical and political action (Foucault 1997; Allen 2008).

All in all, the theoretical aspects of Brown's paper have introduced notions that have potential value in enlarging the conversations and constructions of meaningful elements in this community—that of practitioners and researchers involved in the teaching and learning of mathematics. Brown is right that the question of subjectivity was not one of the main focuses of attention in the SI papers. This does not mean that the contributors to the SI are not interested in this problem or the larger problems of policy, curriculum implementation, etc. The question of subjectivity has gained more centrality in a forthcoming book (Radford, Schubring & Seeger 2008). Perhaps what has to be born in mind is that the sections of the SI were arranged according to different kinds of papers: the authors really were writing as individuals, as Brown notes. The exploratory nature of our summer PME meetings that served as the springboard for the SI justifies the individual nature of the papers: we were each seeing what we could contribute. Thus, providing a unified collaborative product was not a goal.

Brown's thoughtful critique invites us to engage in questions that are undoubtedly important for the advancement of mathematics education in deeper ways, thereby opening avenues for new research. One of them concerns the questions of *subjectivity* and *semiosis*. From a Peircean perspective, there is no inherent dichotomy between *them*. The definition of semiosis by Colapietro makes the following points:

Semiosis. A term originally used by Charles S. Peirce to designate any sign action or sign process; in general, the activity of a sign. It is commonly supposed that signs are

instruments used by humans and other animals: In themselves, they are thought to be inert and thus ineffectual. *Semiosis* is often used in such a way as to challenge this perspective, for it signifies an inherently dynamic process over which human sign-users exert no or at most limited control. In other words, signs are not mere instruments. They exert an agency of their own. (Colapietro 1993, p. 178)

This definition appears to capture the tension inherent in the hermeneutic circle (Brown 1997, p. 37). The “fixity” of a sign is always contingent; its nature is dynamic. In the construction of an interpretant, the meaning assigned to a sign changes. The circular nature of the reflexive process leads to chains of signification, although a spiral might be a better metaphor than a circle for this process because there never can be a complete return to the starting point. The example of the process of *reification* provided by Sfard (1991) also exemplifies this spiral in the context of algebraic objects: structure and process alternate in interpretations of the meaning of a *function*.

The foregoing comments on tensions inherent in semiosis are reminiscent of the layers of meaning that Brown associates with social science perspectives on subjectivity. Perhaps there is more that unites than divides the theoretical perspectives. Given that it is necessary to allow theories to evolve in meeting social needs—including those in mathematics education—the writings of Peirce may still have much to contribute to contemporary discourses in ongoing conversations.

Another possible avenue of research relates to Brown's claim that in Vygotskian perspectives, the central question of semiotic mediation leaves subjective aspects of the internal dynamics of the mediation process and the historical filters for understanding that it provides unattended. He suggests that “Lacan and Vygotsky would agree on much of this [process] but differ in their understanding of how humans relate to this symbolic mediation” (Brown 2008, p. 233). We find particularly interesting Brown's remark that such a process involves subjective difficulties and resistance, little empirical evidence of which has been provided. To sum up, sustained and systematic research is certainly needed to continue exploring the limits, potentials and possible articulations of current semiotic frameworks used in mathematics education (Peircean, Vygotskian, Lacanian, Saussurean, etc.) as well as the possibilities of Foucauldian and other richer conceptualizations of subjectivity and their integration in the semiosis that underpins thinking, teaching and learning.

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