On trust, desire, and the sacred: a response to Johann Muller's *Reclaiming Knowledge*

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> The classification of things reproduces the classification of men.
> – Durkheim and Mauss, *Primitive Classification*

The publication in 2000 of Johann Muller's *Reclaiming Knowing: Social Theory, Curriculum and Education Policy* was an important moment in contemporary education debates in South Africa. Published six years after the first democratic elections, it appeared at a moment of controversy concerning the Size and Shape document, Curriculum 2005, and the new acronyms of post-Apartheid education: SAQA, OBET, RPL. Muller explicitly offered his text as an entry into the epistemological, pedagogical, and political fray. "What knowledge is of most worth for the millennial citizen?" (2000, p.41). What should the relationship be between informal and formal knowledge, globalizing and local knowledge systems, "*cultural* knowledge and skills" and "skills and knowledge for *economic* productivity" (2000, p.41; italics in the original)? Muller presents the terms of the discussion as opposing sides of a variety of dualisms, the nature of which is itself part of the controversy.

Muller exemplifies Bourdieu's characterization of *Homo Academicus* as a "supreme classifier among classifiers" (1988, p.xi). His book is an appeal to keep the boundaries between knowledges well maintained, in the interest of furthering a 'good life' that all South Africans can share. In making his case, he presents himself as both a partisan with "accounts to settle" (2000, p.8) and the quintessentially reasonable man who, given his "relatively moderate and modest conclusion" (2000, p.162), cannot understand what all the fuss is about. In this article, I take Muller's point seriously that something important is at stake here, that the future depends on having knowledge we can trust, and that these debates will best be taken forward by civil dialogue. At the same time, it is essential to problematize the way in which Muller represents these debates and to ask what work the emphasis on boundaries is doing, in Muller's work but more broadly in the current debates concerning South African education policy.

Muller begins from the premise that some kinds of knowledge are simply more effectual than others. He casts his description of that more efficacious knowledge in terms of its systemization: ideas – he is drawing on Durkheim here – become knowledge only when connections have been made between them and they have been formed into "*schemes of classification*" (2000, p.1). Nonsystematic 'knowledge' (inverted commas in original) includes various kinds of local wisdom, folklore and practical know-how. Muller refers to such knowledge as "crude", "vulgar" and, again citing Durkheim, "profane" (2000, pp.13, 77). The problem with profane knowledge, according to Muller, is that it is not "transparent to itself " (2000, p.136); because it does not offer the possibility of interrogation or destabilization, it is not open to critique or change. This failure has implications that are political as well as epistemological: "systematic idealization is the only way to project benign possible futures. Without it, no concept of social change is possible. . ." (2000, p.90).

Muller contrasts this view to constructivist approaches to knowledge. He defines constructivism as "a broad antiepistemological movement (that) has taken a perfectly reasonable set of theses about the social construction of knowledge and has radicalized it into a set of skeptical claims about the constructedness of reality itself, in which reality becomes merely an artifact of our knowledge about it" (2000, p.5). As radical relativists, constructivists see the world as consisting of unlimited models of possible order, each of which is created through autonomous practices. All of these accounts of the world are equally unverifiable and all forms of knowledge therefore equal.

Muller describes the constructivist project as a breakdown between boundaries, between what are variously described as academic and local knowledge, Mode 1 and Mode 2, vertical and horizontal, and, again after Durkheim, sacred and profane. Viewed broadly, constructivism is a form of "excess" (2000, p.5) in that it tries to explode the boundaries between different forms of knowledge.

> These commonalities are of at least three kinds:
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> - between knowledge practices and other kinds of social practices;
> - between different kinds of knowledge practices;
> - between knowledge workers and other kinds of social actor (2000, p.63-64).

At the end of the day, the attempt to break down these distinctions is "irresponsible" (2000, p.52) because it leads to second-rate knowledge, which isn't going to do the disadvantaged any good.

Thus, Muller states his case as one of boundary-maintenance. He accurately describes a central debate in contemporary theories of knowledge as being based on distinction between "insularity" and "hybridity". Insularity is characterized by disciplinary autonomy, purity, fear of transgression, and attention to differences between systems of knowledge and criteria of judgment. Hybridity is characterized by permeability of boundaries and the "promiscuity" of meaning domains. Having no "theory of the boundary", constructivists fall back on what Muller calls "borderless think", a "spurious ideology of boundlessness". Durkheim figures so largely in this analysis because Durkheim is "the exemplary sociologist of the boundary" (2000, pp. 57, 67, 5, 77).

Viewed from the perspective of educational and curriculum policy, "the border in question here is the one between common-sense knowledge and codified curricular knowledge, between ordinary everyday knowledge and codes, texts and canons, the mastery of which is assessed and certified at school". The hybrid project has to do with creating bridges and bringing students into the exploration of the relationship between school knowledge and the students' own knowledges. Muller's concern is with the "limits to this project" and the "unintended consequences" (2000, p.58). Using school mathematics to explore the limits to hybridity and to defend the boundaries between academic and local knowledges, he argues that constructivists are wrong to insist that "any and all everyday experiences are suitable metaphors for mathematical relations" (2000, p.70). Curriculum embodies the values and habits of the group that has won the struggle for symbolic mastery. What the disadvantaged need is access to that cultural capital.

There are a number of issues outlined above that must be interrogated more fully. Nevertheless, Muller articulates what are in fact crucial questions: "How can or should the common-sense knowledge of experience and local culture, indeed of the everyday world, relate to the codified knowledge deemed worthy of inclusion and certification in the formal curriculum?" "How, and under what conditions, can vertical discourse be assessed outside formal contexts of transmission?" What is the proper relationship between world of reason and science and world of "passion and politics, practical activity and everyday life?" (2000, pp.13, 89, 14).

Many of the educational initiatives currently underway in South Africa require that these questions be answered. At a time in which curricular and epistemological assumptions are being revisited, in which the recognition of prior informal learning is underway, and in which disadvantaged groups are

slowly gaining greater access into formal education, it is vital that we explore the relationships among cultures of knowledge and cognitive domains. I am in full agreement with Muller that "a thoroughgoing answer may well contribute to a rethinking of the role of formal educational institutions given the cognitive demands and requisites of late modernity". And I share his hope that such answers might "help to explicate how sacred practices lie nested, often unremarked, within the routines of the everyday" (2000, p.89).

For that reason, I want to engage several aspects of Muller's text. I will first interrogate his depiction of the constructivist claim and his extensive use of a text by feminist mathematics educator Valerie Walkerdine, whom he offers as a counterpoint to constructivism. I then will explore the implications of some of Muller's terminology, a terminology which is suggestive of a number of anxieties that typify contemporary South African academic life.

Muller's representation of the constructivist view

Muller's misrepresentation of the social constructivist school is considerable, even at times baffling. The vast scholarly literature that school has produced has consistently distinguished itself from the kind of epistemological relativism that holds all accounts of the world as equally valid. In opposition to idealist versions of relativism that deny any access to a reality on the other side of language, social constructivist theory in the main draws on a nuanced materialism: different social and historical locations lead to different knowledge precisely *because* the world is concrete. Drawing on Marxian and, ultimately, Hegelian standpoint traditions, constructivism utilizes postmodernism, not to deny the material foundations of knowledge, but to allow for a more careful account of the ways in which knowledge is created, legitimated, and used. It sees the object of knowledge as produced by the material bases of existence, to be sure, but also by human cognitive paradigms, physiological and technological tools of perception, linguistic structures, and social organizations – and by the interaction among all of these things at a given moment of social and intellectual history.

There are, of course, significant differences among those who can be called social constructivists and lively contestations concerning the relationship between language and material existence, the possibilities for and limitations of objectivity, and the relationship between rationality and other ways of knowing. In the main, however, constructivists take the position that an

epistemology must account for both the availability of material 'truths' and the social, linguistic, and cultural lenses through which human beings inevitably access the world. It is possible and, indeed, necessary to have "*simultaneously* an account of radical historical contingency for all knowledge claims and knowing subjects, a critical practice for recognizing our own 'semiotic technologies' for making meanings, *and* a non-nonsense commitment to faithful accounts of a 'real' world". . . (Haraway, 1991, p.187).

Thus, far from arguing that objectivity must give way to a chaos of unverifiable truth claims, constructivists argue that what is usually taken for objectivity in Western knowledge practices is not objective or rigorous *enough* (Harding, 1991). Because they fail to take researchers' own social locatedness into account, conventional Western knowledge-practices do not provide the objectivity to eliminate systematic biases shared by an entire community of inquiry. Far from abandoning any hope of understanding the material world, constructivism seeks to understand the relationship between materiality and our representations and perceptions of it. To quote Valerie Walkerdine, whom I will discuss at length below, "Although materiality is central, there is no simple 'I' who sees or does not see the world as it really is. Materiality is always made to signify" (1988, p.200).[1]

To make the distinction between epistemological relativism as defined by Muller and the social constructivist claim that all knowledges are enabled and

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[1]   Donna Haraway is one of a number of prominent 'social constructivist' scientists who has challenged the accusation of relativism.

   This is not a relativist position, if by relativism one means that the facts and models, including mathematical models, of natural scientific accounts of the world are merely matters of desire, opinion, speculation, fantasy, or any other such "mental" faculty. . . Reality is eminently material and solid, but the effects sedimented out of technologies of observation/representation are radically contingent in the sense that other semiotic – material-technical processes of observation would (and do) produce quite differently lived worlds, including cognitively lived worlds, not just different statements about worlds as observer-independent arrays of objects. . . Obviously, neither I nor any other science studies person, feminist or otherwise, whom I have ever met or read, means the "laws of physics" get suspended if one enters a "different" culture. That is a laughable notion of both physical laws and cultural, historical difference. . . I am interested in how an observation situation produces quite "objective" worlds, worlds not subject to "subjective" preference or mere opinion but worlds that must be lived in consequence in some ways and not others (1997, p.301-2, n.12).

   As was pointed out by a reviewer, Muller's use of relativism, and Haraway's definition here, equates relativism with philosophical idealism. Other definitions of relativism, such as that reflected in Haraway's own position, are perfectly consistent with materialism.

legitimated within social practices, let me use an example from the tragedy of HIV-AIDS in South Africa. The debate concerning disparate knowledge claims is particularly fraught in the case of HIV-AIDS, partly because some understandings have led to horrific results such as the wide-spread rape of children and partly because of the highly controversial position of the South African government. Among the examples of what Muller might call local folklore is the belief that AZT and other anti-viral drugs do not stave off HIV-related illness and death but actually lead to heightened symptoms and death. The fact that informal observation seems to suggest as much can be interpreted as evidence of the limitation of knowledge unmediated by Western scientific understandings and the need for "theories or metanarratives as telling us something common sense can't tell us" (2000, p.136). But the interpretations of this phenomenon from a social constructivist versus a 'relativist' perspective are fundamentally different.

As defined by Muller, a relativist account of the above paragraph would argue that, indeed, there are no standards for adjudicating knowledge claims concerning HIV-AIDS causes and cures. Since reality is simply, in Muller's words, "an artifact of our knowledge about it" (2000, p.5), no accounts of the material and biological bases of disease can be privileged. Because representations give rise to the world, the world can be changed – or HIV-AIDS cured – simply by deciding to change our representations of it. The urbane postmodernists quibble; the poor continue to die.

A social constructivist account, on the other hand, would take as a given that retroviruses and antiviral drugs interact in particular, quite material ways and that some accounts of their interaction, such as those of Western science, have far greater explanatory and predictive power than others. A social constructivist might, however, go on to point out that, according to that same scientific discourse, anti-viral drugs are likely to work only in the earlier stages of HIV-AIDS and that, indeed, at the later stages, they often do make symptoms worse. Thus, while truth claims concerning the benefits of AZT have a high level of validity and usefulness, they only obtain in a particular material and cultural setting, one in which the medical infrastructure is such that HIV-AIDS is diagnosed early, in which the culture is supportive of HIV-AIDS diagnosis and treatment, and in which HIV-AIDS education is functional and effective. In other words, social constructivists are not making claims about the insubstantiality of the material world. To the contrary: their point is that a specific material – and cultural, and physical, and discursive – world always mediates the ways in which knowledge is created, understood and used.

It is possible that Muller would have little trouble with this latter view of AZT as a treatment for HIV-AIDS. Indeed, Muller makes his own case for what he refers to as "mild constructivism" (2000, p.59). He knows that we live in a post-positivist world in which former claims to absolute certainty and objectivity can no longer be sustained. He fully accepts what he considers "a perfectly reasonable set of theses about the social construction of knowledge" (2000, p.4): that knowledge is inherently social; that any and all ways of identifying, classifying, and communicating information about the world are culturally, materially and discursively specific; that the observer is an active participant in the reality being observed; and that structures of meaning are always in flux.

In a chapter called "Reason, Reality and Public Trust," Muller states his position as follows:

> The institution of science has changed; notions of 'useful knowledge' have left us in little doubt that ideas of absolute certainty, objectivity and neutrality can no longer be supported. For all that, and accepting most of it, it is still possible, and more important than ever, to maintain that there is a real social world *relatively* independent from our ways of viewing it, about which we can make assertions of whose veracity we can reliably judge. Just because there are no universal rational values or norms does not spell the end of the enterprise of rational knowledge and research. The naked truth might no longer be attainable but a modestly clothed one surely is, and to be prized all the more highly (2000, p.145-6; my italics).

I have italicized the word 'relatively' in the above quote because it points to what makes Muller's quote contentious; the degree and form of that independence are the crux of the debate. That said, the problem here is that what Muller is calling the 'mild' constructivist position is the position of social constructivists generally. Against his accusation of runaway relativism is a now-vast literature that has explored the organization of knowledge in disciplines, professions, and curricula from precisely to point of view Muller articulates here.[2]

In addition to what I am arguing is a serious misrepresentation, there are a number of problems with Muller's position. First, by representing extremist constructivism as on the offensive and himself as the embattled voice of modesty and reason, he ignores the entrenched power of conventional academic constructs of knowledge and their still-authoritative claims to objectivity and universality. Second, he avoids engaging with the historical

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[2]   Among many representative texts, see Longino (1990), Alcoff and Potter (1993), Levins and Lewontin (1985), and Hess (1995).

context within which the constructivist position has emerged. The critique of Western, metropolitan, and masculinist knowledge practices has importantly focused on the ways in which such practices produced categories of greater and lesser human worth, typically around dualisms concerning moral virtue, free will, and rationality. Muller cites only one specific case, namely the critique of Levy-Bruhl's characterization of African thought as 'irrational', a critique that Muller terms "a gross oversimplification" (2000, p.4). He does not, however, engage the complex claims concerning the 'rational' and the 'irrational' or the 'universal' and the 'local', nor does he explore the value- and power-laden social institutions given form by those claims, one of which, as Muller himself argues, is schooling.

Third, while Muller portrays himself as finding it "sometimes hard to credit, let alone account for, the vituperation and bile" (2000, p.162) with which constructivists state their case, his usurping of the densely populated middle-ground between positivism and idealism is hardly encouraging of a more collegial dialogue. "It may," he says – and it is hard not to read this as a sneer, "seem surprising to enthusiastic anti-positivists, but there is very little in this critique that is controversial" (2000, p.150). Similarly, "(o)rdinary people in the everyday sensuous world believe in that world as precondition for acting in it" (2000, p.81). This stance is unfortunate, it seems to me, precisely because there is a vital social imperative common to the well-meaning on both sides of this debate.

Finally, Muller elides one crucial distinction at the heart of the constructivist case, namely, the distinction between asserting that all cultures of knowledge are equally compelling and insisting that the relationship between them should be explored. He characterizes constructivism as emphasizing "commonalities, or even identity" among different knowledge practices (2000, p.63-4). The slippage here between 'commonality' and 'identity' is central to Muller's case. But there is a huge difference between seeking commonalities as part of a larger project of understanding the relationship among different cultures of knowledge and blithely insisting that all distinctions are simply the by-product of social inequality. Muller's lack of precision in drawing the ways that constructivists make that distinction allows him, as I have argued, to usurp the mainstream constructivist position. But it also allows him to close down precisely the inquiry he purports to further, namely the question of how to understand the relationships between them in a way that allows for dialogue across formal and informal discourses and with it, both more equitable economic and social arrangements and more effective curricula.

Thus, Muller does not move forward the exploration of how knowledge is produced on the two sides of the dualism, why formal knowledge systems matter, how formal and informal knowledges both contrast and blend, and how we can negotiate the continuities and discontinuities between them. Muller's failure to engage that issue means that the book stays at the level of polemic, standing guard on a boundary that it might otherwise have helped to chart.

Muller and Walkerdine

It is in regard to a number of the issues discussed above that Muller presents maths educator and feminist scholar Valerie Walkerdine as a highly favorable counterpoint to the constructivists. "For her, the existence of exclusive domains of discursive activity is a sine qua non: the problem is how to travel from one to the other" (2000, p.68). Rather than attempting to blur the distinction between formal and informal discourses in mathematics, Muller says, Walkerdine asks how to theorize the recontextualization so that the formal discourse can be made accessible to the widest possible group of learners, including, indeed especially, learners from disadvantaged groups. Muller's central use of Walkerdine is emblematic of a number of points explored above, namely his usurping of the mainstream constructivist position, his too-quick dismissal of the power-effects of formal knowledge systems, and his failure to contribute to the important exploration of how to "travel" from one system of knowledge to the next.

Muller's lengthy discussion of Walkerdine's *The Mastery of Reason* (1988) contrasts her highlighting of the boundary between knowledge domains with the constructivist flattening of those boundaries. He correctly represents her as "recognizing that everyday practices and school tasks are separated by a sharp disjuncture" (2000, p.68), but misrepresents the relationship between his argument and hers. His misrepresentation focuses specifically on the efficacy of drawing on "everyday practices" in the classroom and on the nature of the cognitive empowerment to be gained from "the kind of abstract reasoning entailed in a school situation" (2000, p.68). At a deeper level, it misrepresents Walkerdine's relationship to Western and masculinist knowledge claims that both separate abstract intellectual reasoning from emotion and desire and privilege the former over the latter. It is necessary to review Walkerdine's position in order to identify Muller's distortions and tease out the implications for his argument.

In her epigram to *The Mastery of Reason*, Walkerdine evokes Octavio Paz to the effect that "the dreams of reason are intolerable". In opposition to Piaget's claims for universal rationality, she argues that 'Reason's Dream' is invested in a "fantasy of symbolic mastery", a dream of an ordered universe amenable to rational control. That dream is "central to the bourgeois order" (2000, p.190), and its emergence is ultimately tied to "a specific set of historical conditions when the concern about producing a self-regulated citizen was paramount. . ." (Walkerdine, 1988, pp.192, 190, 7).

Walkerdine locates the primacy of mathematics in the Western and masculinist philosophical tradition that values abstract reasoning, symbolic control, and uncontested factuality. Mathematics gained this position as "queen of the sciences when nature became the book written in the language of mathematics and when mathematics held out the dream of a possibility of perfect control in a perfectly rational and ordered universe" (1988, p.187). It has kept that primacy because of the claim to a universal applicability: the metaphoric content of what is being measured drops away, so that mathematics can be used to measure anything. ($3+4 = 7$ whether we are adding apples or elephants.) This 'forgetting' of metaphoric content in mathematics is the same 'forgetting' of the constructed nature of thought that produces the universalized bourgeois subject. Thus, the seeming decontextualization that mathematics promises is itself a context – a context has everything to do with class, race, gender, sociality, desire, the unconscious and historical locality.

Walkerdine explores the power-laden context of mathematical understanding in her discussion of the words 'more', 'less', and 'no more' in family-based and school-based discourse. She challenges cognitive theorists who, noting that children use the word 'more' before they use the word 'less', conclude that the concept of 'more' comes earlier in cognitive development. She argues, rather, that they are the product of class- and generational power inequities and relate to other material aspects of life such as family income (1988, p.31). According to Walkerdine's alternative account, children use the word 'more' before the word 'less' because of their position within power relations, specifically the regulation of consumption within a family context where parents have the authority to withhold desired goods and within a culture in which consumption – i.e. 'more' – is valued.

It is difficult to see how this differs from a constructivist position that insists on the historicality and power-ladenness of knowledge. Muller's use of Walkerdine's text, which begins so explicitly in a constructivist view, is difficult to explain, or explain away. Muller consistently cites Walkerdine's

data as supporting his position, namely, the incommensurability of experience-based and school-based discourse. (The opposite of 'more' is 'less' in school mathematics and 'no more' around the family dinner table, for example.) He uses those data to argue for the inappropriateness of bringing students' experience into the classroom, presenting them in such a way that Walkerdine appears to be making that same point.

Walkerdine does, indeed, maintain that there is no direct correlation between family-based and school-based mathematical practices. To have epistemological access to school maths, students need to learn formal relations of signification and begin to recognize the rules and purposes of what is going on. The goal of research should be pedagogy able to help the widest possible group of children negotiate the shift into mathematical discourse. To do this, according to Muller, however, the profane world of learners' informal practices must be kept outside the classroom. To Walkerdine, that boundary is always already breached.

According to both Walkerdine and Muller, the gradual suppression of metaphoric content is key to the transition between informal and school-based mathematical practices; children must gradually understand that the physical properties of the objects being measured are unimportant to their function in math. This is achieved through a string of signifiers that increasingly detach from the object itself by suppressing the metaphoric content. Walkerdine's example, cited by Muller, is of a middle-class mother helping her daughter move from planning a garden picnic to understanding the written numeral as a symbolic signifier. In each step, each signifier becomes the signified for a new signifier at a higher level of abstraction.

Muller, however, also presents a counter-example, namely, the study by Carraher *et al*. of Brazilian street children selling coconuts, which he cites as the kind of intuitive but "highly idiosyncratic" mathematical practice that is distinct from school-based algorithms (2000, p.60). This, to Muller, is precisely the kind of content that does not belong in school-based mathematics because it does not lead to abstract reasoning. By keeping the attention on the metaphoric content – i.e. the coconuts being sold – rather than the logical relationships on which mathematical discourse is built, such content would deny the disadvantaged mathematical reasoning, access to higher education, and cultural capital.

Muller presents the case of the coconut-sellers as of a piece with Walkerdine's argument, consistent with her notion that there is no direct correlation between

informal and formal knowledge-practices. While Muller lauds her point that "the problem is how to travel from one to the other" (2000, p.68), his argument, in opposition to hers, however, is that the informal learning of the poor is no place to start. Walkerdine would also argue that there is a path to be walked between selling coconuts on the street and the distributive axiom of multiplication over addition, but it isn't clear why planning a picnic is a way to begin that path but that selling coconuts is not.

The operant difference, in pedagogical terms, is that the planning of the picnic was being used by an educated parent as learning opportunity, while there was at least no visible comparable adult among the street urchins selling coconuts. But that argues, surely, for a pedagogy in which the teacher substitutes for this educated parent, not that such profane content does not belong in a classroom and that it does those children a disservice to say it does. Walkerdine is critical, not of the use of experience in the classroom, but of pedagogy that, under the guise of teaching children the discourse of formal mathematics, is actually teaching them something else. In other words, her argument is that we are currently managing the 'hybrid project' badly. Muller's is that we should not be doing it at all.

Walkerdine's example of a poor use of students' informal knowledge is the "shopping game" through which young children are taught to subtract from 10. At the start of the game, working class children are given cards representing small amounts of money with which they can play at purchasing goods. An airplane can be purchased for 5p, a basket for 2p. After each purchase, the children are helped to subtract the amount they have spent. The children studied use the game to act out a fantasy of being rich while regularly evidencing the knowledge that, in the 'real world', airplanes and baskets cost far more. The assumption behind the pedagogy is that children learn arithmetic processes through the handling of small amounts of money at a time in which they are developmentally unable to conceptualize numbers or money in larger terms (1988, p.139).

Walkerdine makes a number of points about the shopping game. Her first point is to affirm the validity of the kind of the informal knowledge disparaged by Muller, in this case the children's sophisticated knowledge of the ways in which quantifiable resources have power in the world. She challenges such educational theorists as Williams and Shuard for saying that a young child can manipulate small amounts of money but that "the idea of money as meaning the exchange value of goods will be beyond him (*sic*) for a long time to come." She says, rather, that what appears to theorists to be a difficult and

highly abstract concept, namely the relationship between labour, money, and the purchasing of goods is understood "all too well" by quite young working class children as a concrete element in their lives (1988, p.140). Working class children don't typically have experience using the very small sums in the shopping game, but "they are constantly surrounded by other, more sophisticated relations which have *concrete* and *material* effects on their lives and those of the people around them" (1988, p.144). Their knowledge includes an understanding of exchange value, a realistic assessment of how much something will cost, and insight into the relationship of money to ongoing domestic life. Where Muller cites the informal learning of poor children as less than useful, Walkerdine follows Varnava-Skouras in concluding that the life experience of poor children gives them a privileged standpoint from which to understand the economic system and its effects.

Walkerdine's second point is that the difference between working and middle class children's education in mathematics must be seen, not in terms of cognitive development, but of differing desires. While working class children exposed to the shopping game are acting out a fantasy of wealth that they know is utterly fanciful, middle class children are being initiated into a dream of mastery that is pleasurable because it allows for the illusion of control. Walkerdine's criticism of the shopping game is not that it brings experiential learning into the classroom but that it encourages the wrong kind of fantasy of power. It is the fantasy, and not the arithmetic, that remains at the level of metaphoric content; the children are playing, not at mathematics, but at being rich. The two differing forms of desire differentially encourage internalized forms of privilege and disadvantage that help to maintain social inequity.

There is a curious and telling overlap between Walkerdine's argument and Muller's. To Muller, the empowerment gained from formal schooling is based on the ability to think systematically. Broad problem-solving and research skills, he argues, have the most long-term market value. Proficiency in formal mathematics is important because it is an entrance requirement for access into many post-graduate fields. "Learning what counts" (2000, p.65) is thus put in terms of symbolic capital, a means of entry rather than something worth knowing for its own sake. "'(R)eal' chemists," to use Muller's example, "do not actually do the things that schoolchildren have to do to learn school science, but it is on the basis of the latter that chemistry 'competence' is constructed, evaluated and rewarded in the school system. This recontextualization is clearly a result of, and will in turn exercise, considerable symbolic power" (2000, p.63).

What is missing from this argument is any exploration of what school-based practices give us that is helpful for their own sake rather than as forms of cultural capital. What is actually being learned at school that gives children the habits of mind and activity to function as productive, thoughtful, fulfilled members of a viable society? Muller's claims rest on a somewhat circular argument: what is taught in, say, school chemistry may have nothing to do with what chemists do, but since educational success is predicated on mastering school chemistry, it is what students must learn. But if the power of school learning is only "symbolic", then perhaps Muller's purported extremists are correct that "the boundary between the mathematics curriculum and everyday knowledge is artificially exclusionary, epistemologically unjustified and must be removed" (2000, p.65). Let me say at once that this is not my argument. But I do believe that it is incumbent upon us to ask: what is it about the learning that "matters" besides – and I do not underestimate the importance of this factor – the symbolic power of an academic degree?

Walkerdine has a forceful answer to this. Education in formal maths and science is empowering because it is part of an initiation into social and intellectual entitlement; what is being developed in middle class children is a certain kind of self as much as a certain kind of intellect, an identity based on as much on a hierarchy of prestige as on a habit of mind. Central to the ways in which children are taught differential claims to epistemological agency are "relations of fantasy, power, and desire, . . . lived relations of power and powerlessness" (1988, p.198) in which gender and class are re-inscribed. Conventional middle class schooling is an education in social authority, and it is certainly arguable that education should provide poor children with the intellectual and attitudinal mind-set to succeed in those terms. But, as Walkerdine puts it, this "is a long way from the dream of reason" (1988, p.201). It is also a long way from Muller's claim that "systematic idealization is the only way to project benign possible futures" (2000, p.90). And it both problematizes and embitters his equating of formal knowledge systems with the reflexivity to dream a more equitable society.

Mathematics, desire, and the sacred

As Walkerdine points out, conventional discussions of maths education have often been put in terms of desire, specifically the adjudicating of proper versus improper forms of pleasure.[3] According to this discourse, children are to be encouraged to feel "(j)oy in discovery, pleasure in order; not pleasure in other less rational matters, but love and pleasure in ideas. The goal has been to produce children who would become adults without perverse pleasures" (1988, p.6) in "a world freed from clouding emotions" (1988, p.186). It is here that Walkerdine locates Piaget's vision of education as the "triumph of reason over emotion" in which "the animal passions would be left behind" (1988, p.5).

Walkerdine, as we have seen, locates the privileging of mathematics in the West in the Enlightenment, and ultimately Platonic, dream of Reason as social control (1988, p.187). What middle class children are being taught is a fantasy of playing God, with God as "'the Divine mathematician', the fantasy inscribed in the Cogito, the Ratio" (1988, p.199). This dream of Reason holds that the world, as "God's epistle to mankind", is "written in mathematical letters" (Shapin, 1994, p.311). But the importance of mathematics is less that it helps us measure and know the world than that it helps us to transcend it. Indeed, the lack of direct correlation between mathematical procedures and the material domain is seen as an important part of its contribution to a moral, well-ordered society; as a means of verifying knowledge without recourse to direct experience, it carries the promise of protection from the defilement of the everyday.

In beginning this exploration, I pointed out that Muller's evocation of the "sacred" grounds his terminology in a religious metaphoric. Some aspects of this should be clear by now, specifically the use of the moral vocabulary of modesty versus promiscuity applied to theories of knowledge, the relationship

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[3]   As an example, she cites Harold Fletcher's once-popular *Mathematics for Schools* (1970): "children will derive pleasure from the purity and order which they discover" (cited in 1988, p.189).

of mathematics to desire, and the notion of mathematics as language of God.[4]

The distinction between the sacred and the profane is a major theme in Durkheim's *Elementary Forms of Religious Life* (1947). Profane knowledge includes the material world of everyday sensual experience in which meaning comes directly out of social and interpersonal engagement. Sacred knowledge, on the other hand, is characterized by a symbolic order of conceptual relationships and representations (2000, pp.77-8). According to Durkheim, the distinction between the sacred and profane is "absolute".

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[4]   Muller characterizes his position as 'modest' at a number of points in *Reclaiming Knowledge*. He portrays himself as a reasonable man who is startled at the outraged response to his "relatively moderate and modest conclusion" (2000, p.162). And he portrays the truth left available to the post-positivist world as, if no longer "naked", then at least "modestly clothed" (2000, p.145-6).

Modesty as an epistemological descriptor has a quite specific social history; it has its origins in the writings of seventeenth century English experimental science, most specifically in the paradigmatic figure of Sir Robert Boyle. Claiming authority only in "matters of fact"; writing in a "naked" style in explicit contrast to the "promiscuous experiments" and "florid" style of "others", and surrounding himself with "diligent and judicious" men as witnesses to his experiments, Boyle coded the "modest" and "diffident" gentleman as the new epistemological ideal. Unmindful of personal gain or advantage, the genuine "natural philosopher" would be content with bracketing the incontrovertible facts he discovered from the speculations of less modest men (Boyle 1965, pp.306-307; Shapin and Schaffer 1985; Shapin 1994).

Modesty as an epistemological claim is thus historically located within the two contradictions of its origins. First, the claim of modest witness is producible only within high social ranking; Boyle himself, son of the Earl of Cork, personifies a modesty that was understood by his contemporaries to be a form of noblesse oblige. Second, the form of modesty being enacted here is the other side of what Donna Haraway (1997) has termed a dizzying conceit. In separating 'matters of fact' from causal explanations, Boyle could display modesty concerning the latter while at the same time claiming that his 'matters of fact' are unassailable mirrors of reality, unopen to debate or interrogation.

A lifelong celibate, Boyle identified mathematics as a means of "disciplining the mind" and, in the process, contributing to the "Practice of Vertu". Boyle maintained he could control his "raving tendencies" through the use of "Geometricall Speculations". Using mathematical exercises to avoid importunate desires, he could "fix" his thoughts – and the verb is significant – through the "Extractions of the Square and Cubick Roots, with those of other more Difficult and Laborious Operations of Arithmetick and Algebra" (Shapin, 1994, p.320). Read with twenty-first century eyes, this assertion of Boyle's is not without its humor, and I do not suggest that the present issue is the use of mathematics to keep children's hands from straying under the desks. Still, the image of Boyle finding the cubic root of numbers as a way to ignore the desires of the flesh echoes oddly with Walkerdine's theme of mathematics as promoting the wish for control over a rational and ordered universe.

> In all the history of human thought there exists no other example of two categories of thought so profoundly differentiated or so ... opposed to one another ... .The sacred and profane have always and everywhere been conceived by the human mind as two distinct classes, as two worlds between which there is nothing in common ... .The mind irresistibly refuses to allow the two corresponding things to be confounded, or even to be merely put in contact with each other; for such *a promiscuity, even too direct a contiguity,* would contradict too violently the disassociation of these ideas in the mind (1947, p.38-40: my italics).

Muller's use of the notion of the sacred to characterize formal school-based knowledge is consistent with this rhetoric. His discussion of Migiel Hendriks, an unschooled farm worker charged with making wagons, is a case in point. Muller takes his account from the work of Gibson (1996) on the cognitive practices of formally illiterate workers. In interviews with Gibson, Hendriks explains how he calculates based on an understanding of the distribution of weight, the heaviness of the construction materials compared to the likely heaviness of the load, the optimum placement of jack and axle, and the required amount of building materials. In the process, he shows an understanding of the principle of leverage, two- and three-dimensional constructions, and spatial thinking.   Hendriks explains that he calculates all of this in his head. "I may not be able to read or write," he tells Gibson, "but I use something I have learnt in one case and adapt it a bit to fit in another case" (1996, p.55).

Gibson's project is to explore the use of higher-order and abstract reasoning among formally illiterate workers. Her argument, which draws on work by O'Connor, Gee and Scribner, is that "Migiel Hendriks's competencies typify those of workers who perform complex cognitive tasks on a regular basis and reveal what Scribner calls 'intellect at work'" (1996, p.53). She argues, further, that, "according to Gee's (1990:153) definition, Hendriks has mastered a secondary discourse involving 'a great many of the same skills, behaviours and ways of thinking that we associate with literacy'" (1996, p.55). He is, in other words, an example of an overlap between knowledge domains characterized by 'promiscuous' combinations of abstract and concrete thought. Hendriks, moreover, is like many farm workers who recount that they have been taught their skills by co-workers on the job. Thus, Gibson's discussion emphasizes a number of specific elements concerning Hendriks' knowledge: that it involves the ability to construct a product mentally before building it physically; that it requires an understanding of principles of what we call science; that it exemplifies cognitive border-crossing; and that it participates in the collective culture of knowledge that workers share. This is not far from what Marx defined as the crux of what makes work "exclusively human":

"A spider conducts operations that resemble those of a weaver, and a bee puts to shame many an architect in the construction of her cells. But what distinguishes the worst architect from the best of bees is this, that the architect raises his structure in imagination before he erects it in reality" (1974, p.174).

For much of his discussion of Hendriks, Muller follows Gibson's lead. He recognizes that Hendriks can perform abstract calculations, extrapolate, shift three-dimensional objects in his head, and use formal measurement and quantification. But he diverges from Gibson's discussion on two revealing points. First, while he agrees that Hendriks has advanced metacognitive skills, he insists that Hendriks has developed his "rather sacred form of common sense" as "a style of reasoning evolved all by himself " (2000, p.88) rather than as part of a collective culture of workplace knowledge, as Gibson contends. Second, Muller wonders how Hendriks "stumbled, uninducted as it were, into the realm of the sacred, into vertical discourse" (2000, p.89). Muller posits an exposure to vertical or protovertical discourses available through television, Bible study, the reading aloud of newspapers, and the literate people on the farm.

Thus, even a clear case in point of a worker's high level of 'sacred' knowledge becomes, in Muller's hands, an argument for its absence. Far from being typical or even one of a number, Hendriks becomes a solitary phenomenon who must somehow have learned to think through a hidden interaction with formal knowledge systems and who can only communicate what he knows to those adept at those formal knowledges. Drawing on Gibson's evidence but using her material to make the opposite claim, Muller presents Hendriks as an exception that proves the rule and confirms that the "the manner in which this passage is effected, when it does take place, puts into relief the essential duality of the two kingdoms" (Durkheim, 1947, p.39).

Boundary-maintenance and the South African discourse on education

It is important to problematize the work the fixation on boundaries is doing in the current South African context. Why is it so frightening that an unschooled worker has the cognitive and social context within which to design a wagon? Or that selling coconuts can serve as well as planning a picnic as an entry into formal maths? Walkerdine, Gibson and constructivists generally assume that different knowledges are produced within different social domains and that

there is no obvious or transparent way to transfer from one to the next. Rather than concluding, however, that only some activities can produce 'higher order thinking', they conclude that people develop and utilize such thinking at different occasions and for different reasons depending on culture and circumstance.[5] Thus, they allow us to ask different questions about – and to – a thinker such as Hendriks. Rather than wondering how he had absorbed forms of cognitive thought through hypothetical exposure to formal discourses, we might ask how he developed them *in the absence of* such exposure. If he did not develop his cognitive abilities through formal discourse, how did he develop them? If he is not utilizing schooled thinking in exercising his creative intelligence, what is he doing instead? Answers to those questions can inform a pedagogy that builds the kinds of bridges Walkerdine proposes. They can begin a process that is based neither on the insistence that insularity "should never be in question" (2000, p.48) nor on a hybridity that denies that some forms of knowledge are particularly advantageous in accomplishing particular things. Rather, it can be based on precisely the exploration that Muller proposes but does not further, an exploration of the relationship between knowledge of the everyday world and the formal curriculum. And it will allow us to ask what it is about that formal curriculum that leads to more equitable forms of intellectual empowerment, the terms under which it both authorizes and erases, and what all of us need to learn from both formal and informal knowledges.

While Muller is particularly focused on the purity of boundaried formal knowledge against the promiscuity of knowledge domains, he is not atypical of a particular stream in the current writings of South African academics on the subject of curriculum. One of the most salient characteristics of the current South African discourse on education is the consistency with which cognitive issues are framed in terms of incommensurability.[6] The discourse both recruits explicit dualisms such as abstract/concrete, formal/informal and academic/local and draws on implicit ones such as mind/body, thought/emotion, head/hand. Recent South African academic discussions of the recognition of prior learning, for example, are regularly grounded in a variety of dualistic taxonomies: vertical and horizontal (Bernstein), formal and practical (Bourdieu), context-dependent and context-independent (Vygotsky),

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[5]   See Cole *et al*. (1971) for a classic statement of this position.

[6]   For helpful discussions of this point, see Osman (2003) and Breier (2003).

generalizing and localizing (Dowling), and Mode 1 and Mode 2 (Gibbons *et al.*).[7] Muller's own contribution, of course, is Durkheim's sacred and profane.

As I argue above, it is a mischaracterization of the mainstream constructivist position as to see it as denying that any such distinctions exist or that there is nothing to be gained from thinking broadly and carefully. I know of no serious educational theorist who opposes teaching learners to be more at home in vertical, textual, and formal categories of thought. Like Walkerdine, however, they do typically argue, first, that such categories are not innocent of either history or power and, second, that complex relationships of overlap and complementarity have often been hidden by and through those power-effects. While I do not have the space here for a full exploration, two points need to be made concerning the currency of dualistic argumentation in the current South African context: that they *are* a specifically South African phenomenon[8] and that they cannot be separated from their own history.[9] It is important to ask what work such dualisms do in contemporary educational debates: What policies do they suggest? What curricula do they hinder or enable? What assumptions do they reinscribe concerning the nature of thought and the relationship between thought and social categories?

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[7]   See Bernstein (1999); Vygotsky (1978, 1986), Dowling (1998), and Gibbons *et al.* (1994). For examples of the use of dualisms in South African academic discourse on education, *see* Shalem and Steinberg (2000), Harris (2000), Breier (2002), and Breier (2003).

[8]   As Osman (2003) has noted in terms of RPL, the attention to epistemological dualisms in the literature of experiential learning and the preoccupation with gate-keeping are a specifically South African phenomenon. They are not present in the extensive international literature that has come out of the US, Canada, Britain, Australia, and New Zealand, and their presence in the South African context itself has to be problematized and explained. They may be explained to some degree by the fact that the historical inequities of the educational system are more extreme in South Africa than in other white settler societies and that entry into both the neo-liberal global economy and democratic government has been foreshortened. But the attention to gate-keeping and the insistence on the purity of knowledge-domains may also reflect a defensiveness that is a product of the historical moment in which South African academics find themselves, in which the movement for a more just South Africa in which, to their credit, many of them participated, has, as it were, moved closer: out of the halls of government and into the classroom in ways they are not fully able to control. One of the ironic results of this is that, in many cases, the dualist categories are taken from theorists, such as Bernstein and Bourdieu, whose own use of them is epistemologically nuanced and politically progressive but who are used in South Africa to point to far more conservative conclusions. Muller's use of Walkerdine here is another case in point.

[9]   There is no denying that the use of such categories in Africa has a long and unlovely history. They were utilized consistently within colonialist anthropology to represent Africa and Africans as the less-than-fully-human Other. For discussions of this, see Masolo (1994) and Mudimbe (1988).

Progressive white academics such as Jo Muller have an honoured place among the white South Africans who opposed apartheid. They long ago committed themselves to justice and to the use of education in the service of more equitable participation and prosperity. As a progressive white academic from New York who came to South Africa for the first time in 1995, I have nothing but respect for the role that Muller and others played. Yet there is something about his discussion of Hendriks that seems an erasure of that history. I have no quarrel with Muller when he laments the denial of the benefits of formal education in the past, and certainly none when he advocates access to formal education in the future. But there is something disturbing in the argument that the cognitive worlds of black South African workers do not allow for envisioning a better world. Surely, the vision of a post-apartheid future was carried most deeply in the minds of those who fought and resisted – and learned and taught – their way into a future based on a richly seen "concept of social change" (2000, p.90).

Muller, of course, is ultimately correct that knowledge must be based on trust. We manage our lives based largely on what other people tell us is true and depend deeply and always on the trustworthiness of that knowledge. Muller's book is a reminder of how vital it is to practise good faith among scholars, to be trustworthy in representing the arguments of our adversaries and our allies, and to take each other's cautions seriously. While I take issue with his belief in dualistic insularity and while I believe that hybrid knowledges have always been the norm, Muller is also correct that the mutual demonizations across post-positivist epistemologies have failed us. The trustworthiness of knowledge is predicated on the wisdom to understand which kind of knowledge best suits a given purpose: when it is that science can put needed knowledge into our hands; when we must listen to other forms of knowing. There are overwhelming problems facing South African education, so many that faith in either formal or informal knowledge can appear a kind of nostalgia. But if South African history has proven anything, it is that people dream a better future within – and across – many social and cognitive domains.

Who will be given social agency is both an epistemological and political question. Whose experience of the past and whose vision of the future will be considered credible? Whose modest testimony will be allowed to contribute to a shared understanding of the nature of the world? If we are to dream a better future, we will have to attend to practical knowledge and local wisdom. We will have to give many more people access to formal knowledge. And we will have to learn to live in a world in which both those things are true.

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