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GETTING OVER EPISTEMOLOGY AND TREATING THEORY AS A RECYCLABLE SOURCE OF "THINGS"

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This paper challenges the way in which we are inclined to treat theory and suggests that our tendency to privilege it over method is counterproductive. Some consequences of privileging theory are pointed out and a remedy is proposed. The remedy entails a number of 'reversals' in the way we treat theory and method in maths education research, the foremost of which is to privilege method and "treat theory as a recyclable source of 'things.'" The notion of 'reversal' is presented here only in passing and the application of the proposed treatment is briefly illustrated in the context of this researcher's own work.

What can I know?

When approaching a question for the first time I must ask, "what do I know?" Answers will typically lie somewhere within the rough boundaries set by "more than I can say" and "less than I think." I must then ask, "what can I know?" and, when doing social science, I come to a sticking point. Whether the question is applied to what I can know about others or myself; I take it that social science's principal object, the social man observed, is also a subject, an observing agent, with desires and a will of his own so that this object-subject is well within its rights to object to my descriptions and explanations of it (Latour 2003). Because social science relies on the third person reports of its subjects and the first person reports of its object-subjects there is a good deal of room for doubt as to the reliability of those reports and the truth[1] of any theory that claims to give an account of them. Because my principal object (i.e. the individual in interaction with his world and others in it) is also a subject, and because I am compelled (by my own moral economy) to share the products of my enquiry in a way that is truthful and useful;[2] I take it that *if a theory has any merit at all then it will point out the objects of its explanatory principles in the substance*[3] *of the phenomena it claims to explain*.

The limits of the truth of what I know and what I can know about my objects of interest does not mean that I give up on theorising about them; it just means that I must be very clear about the terms under which I do so. I suggest that at present we[4] tend to privilege theory and that, whether this practice is a conscious one or not, it is a habit that has some unhelpful consequences. This paper's purpose is to point out some of these consequences and to suggest a corrective in the form of a change in the way that theory is treated.

Theory, method, and truth

For the purpose of this paper, let's say that a theory (any theory) is an explanatory principle constituted by the description of its collection of valued objects and their interrelations. In mathematics education, research objects can be anything of interest, including; 'subjects as objects' (learners, teachers and such), 'artefacts as objects' (classroom texts and curriculums, and so on) or 'abstractions as objects' (natural numbers and triangles, for example). We are also concerned with objects produced by the principles through which we attempt to explain the phenomena of teaching

[1] The truth of theory is something that this paper will unpack.
[2] Truth and utility are treated here as distinct value conditions. I take it that the truth is not always useful and what is useful is not always true.
[3] That is, the material evidence used to warrant an existence claim. Here, the term "substantial" refers to material substance.
[4] When this paper uses the pronouns "we" and "us," or their possessive form "our," it refers to researchers in maths education and the professional communities with which they are enmeshed (other researchers, practitioners, trainers, and policy makers).

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and learning, such as Vygotskii's 'zone of proximal development' (Vygotskii 1978, p86), for example. With respect to method; I take it that method is the collection of valued practices and instruments used to observe, measure, probe, analyse, etc. our objects of interest and to produce and test theory. These descriptions, or words to their effect, are not new. They are consistent with a conventional view that links method and theory in a dialectical relationship of process and product, with theory as "truthful product" to method's "trusted process."

I take it that a theory's value is measured by the truth and utility it is held to have by a given community. Setting aside the question of utility for the moment, the question of the substantive evidence of a theory's objects and their interrelations, raised at the end of this paper's opening paragraph, is one response to the question of a theory's truth that this paper will elaborate. For the time being, let's say that truth is an effect of persistence[5] and authority[6]. This definition will not satisfy everyone, it is simply offered here in an attempt to forestall any distraction that the use of a heavily coded word like truth might cause to the development of this paper's argument, which is not much affected by whatever definition we use.

While theory and method are usually presented as being of equal importance, with the epistemic status of theory resting on the validity and reliability of method, I suggest that in practice theory tends to be privileged over method. By privileging theory I mean that we are inclined to attach greater importance and value to it, we are inclined to elevate it, we give it precedence or superiority over other aspects of our practice – we protect it. For the researcher, theory is usually both the starting point and, more importantly, the culmination of enquiry, so naturally a great deal of value is attached to it. For the researcher's audience, theory, if it wins their support, can become something transcendent, something seen as existing outside the sphere of their practice. In extreme cases, theoretical objects become reified and take on an existence of their own. I suggest that, at present, we treat theory's purpose as being to explain, predict and control, with method's purpose being to validate those explanations – a tacit expression of theory's privileged status.

The problem of privileging theory

I suspect that as a species we privilege theory because we are chronic explainers. We crave explanation, and the essential purpose of explanation is the possibility of predicting the future and realising our desires. This desire for explanation, and its promise of prediction, contributes to a tendency to see design (the reason for things being as they are) as always operating top-down so that we come to believe that a thing is as it is because there is a theory "out there" that says it can't be otherwise – some universal and natural law with transcendental and absolute authority. Such a treatment not only risks reifying theory's objects it risks deifying theory.

An example from everyday experience of a theoretical object that has been reified is not hard to find. Newton's natural "law of universal gravitation" entails an object, gravity, that Newton himself could not explain. He could not explain the means by which bodies at a distance operated on one another, but he could describe the phenomena that he observed. Gravity served as a rhetorical device (rather than an explanatory one) that gathered together, and stood in the place of, some differential equations that could be used to predict the movement of the planets. In spite of Newton's absolute rejection of the idea of gravity being inherent to "brute matter" (Newton 1693) the word entered into common use and came to be seen as a real thing – in other words, it was reified. In common use it was, and still is, said that gravity *causes* things to fall. Such a use of language arises naturally for us and perhaps unfolds as follows; a pattern is observed in a particular phenomenon, that pattern is formalized as a

[5] That is to say, that any relatively stable ensemble of features that persists in a given setting over time (i.e. has appeared many times in the past and will probably continue to appear in the future) can be regarded as belonging to some recognised "thing."
[6] Our recognition of any "thing" according to the description of its features or properties is authorised by whatever means satisfy our community.

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"universal law," that law comes to be granted an existence with the power of agency or causation, and that "agent" is given a name, in this case, gravity. When a theoretical object is said to be the cause of something then, consciously or not, we are privileging theory.

The zone of proximal development (ZPD) is an example from social science of a theoretical object that has, I suggest, come to be reified. Vygotskii first introduced the notion of ZPD as a rhetorical device rather than an explanatory one (Valsiner and van der Veer 1993, pp44-5). He wanted to conceptualise a causal system of development of the psyche and to promote a research focus that emphasised the coming into existence of higher mental functions rather than the simple recording of their already established existence.[7] The notion of ZPD arose directly from Vygotskii's material and social-historical explanatory principles but it had, and still has, no substantive link to any material circumstances that might indicate its existence. It is a concept that was devised to bring together the features and functions of his theory and to point them toward some useful pedagogical application (see Vygotskii quoted in van der Veer and Valsiner 1991, p340), but, whatever Vygotskii's intentions were, ZPD has passed into common use (within our community at least) and has been reified.

ZPD has been treated as different things at different times but typically it tends to be seen as a property of the individual psyche, a condition (a cause) for the possibility of the psyche's development and/or a measure of the potential extent of that development in the near future (although some scholars (Lerman 2001, for example) suggest an alternative view).[8] The notion of ZPD as a property of the child has informed, and survives in, pupil-centred teaching philosophies and curriculum design. If ZPD is being treated as a real feature of the psyche, a real thing, a developmental potential that the pupil possesses, then we risk thinking that teachers need only assess a pupil's existing level of development and then realise that child's potential with appropriately designed tasks. In treating ZPD this way we not only mistake it as a cause, we suffer the injury of overlooking the bulk of Vygotskii's work and loosing the potential insights and lines of enquiry that those other "things" in his theory have to offer our understanding of teaching and learning and the development of the psyche.

I suggest that "things" like ZPD have come to be used, and misused, to the point where they have lost, or at least not realised, their potency as objects of enquiry. I believe that the notion of ZPD, and the explanatory principles that produced it, has more value in it than we have permitted it to yield. The tendency to reify objects like ZPD exposes our privileging of theory, and this habit is unhelpful.

Some unhelpful consequences of privileging theory

By privileging theory we risk coming to endow it with a sacred quality. The greater a theory's success the more sacred (and concrete) it becomes. But such success eventually becomes a drag on our understanding with a good deal of effort being expended on epistemological concerns. The operation of this theory-privileged drag is indicated by displays of attachment, such as the sanctification of a theory's author and the sedimentation of its objects in common use. This drag is a (metaphorical) resistance to change and a brake on our theorising. For an example from the natural sciences of the operation of this theory-drag, remember that before there could be a Newton there had to be a Galileo, publicly punished for his mistakes. Evidence of this drag operating in maths education might be found in the "math wars" (see Klein and Marple 2005, for example). This conflict broke out in the 1990's and continues to this day. Pitting traditionalists against reformers, a battle is underway over what school maths is, and how it should be done. This example shows, among other things, how we tend to privilege theory by, for example, seeing the pedagogue's choice between instrumental and relational understanding (Skemp 1971, pp43-6) as being exclusive when it is not.

I have already touched on one unhelpful aspect of privileging theory through our tendency to see design as always operating top-down. For example, I might explain a phenomenon by saying "input X

[7] As is the case with intelligence tests, for example (ibid.).
[8] The view of ZPD as an attribute of the individual has been challenged (by Stephen Lerman for example), but the view remains widely held.

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and theory says that Y will come out." This form of expression exposes our natural, causal way of understanding. A consequence of this natural way of understanding is that it risks being taken that knowledge can be simply applied, in isolation of particular circumstances, directly to the solution of problems. For example, if ZPD is treated in isolation as a property of the psyche, as a kind of field effect (like gravity) that predicts the possibility of an individual's future mental development given their current developmental state (for example, the belief that a child's assisted mental age is around two years greater than their developed mental age), then we risk treating it as a cause in isolation of the Vygotskian principles from which it sprang. We risk misusing teaching strategies, like scaffolding, that, instead of being pupil-centred, become solution-centred. When we privilege theory, we risk treating things like scaffolding as a kind of action that can cause pupil development. Our natural causal way of understanding leads us to thinking of scaffolding as something that someone does to someone else, and that it can be done in isolation of local conditions and the particular circumstances of teacher and pupil, to achieve a desired effect. Scaffolding (by the very nature of the metaphor) supports the activities that contribute to construction, it does not constitute it – scaffolding supports the builders, not the building. Contrary to our declared pupil-centred values, the consequence of assigning scaffolding an agentic rather than catalytic role is that the general (our theory and its reified objects) is privileged over the particular (situated subjects in interaction).

A theory's success can also have the counterproductive side effect of feeding the human temptation to mouth slogans and catch phrases. The catch phrase or slogan cuts two ways, it can be a mark for or against its user. As a mark of acceptance it is a token of belonging and collective power, a symbol of authority in the face of perceived threats from without or dissent from within. I suggest that ZPD, for example, has become such a catch phrase. As already mentioned, one of the unhelpful consequences of privileging theory is that we risk reifying its rhetorical devices, discursive objects like ZPD, that then cease being dynamic objects of enquiry and discourse, and become instead static objects of power and control, used to validate (or invalidate) the kind of academic and professional discourses that privilege answers over questions. We can see the terms under which we tend to treat objects, like ZPD, that constitute our stock of knowledge, if we consider the style of language that we use in relation to it, for example: we theorise about a phenomenon so that we can *apprehend* it, *grasp* it, and *capture*, *arrest* and *possess* it. The image that this language evokes is one of power, not a creative kind but a constraining one, a power of containment, cessation, conclusion, control, and certainty.

Another unhelpful consequence of our tendency to privilege theory is that we tend not to tolerate more than one theory at a time. A given community will tend towards a theory according to their common value-judgements. The appearance of a competing theory may offend a community's values and/or threaten their theory's authority. The followers of different schools of thought are then faced with a choice as to how they respond to one another. A range of responses are possible, for example; that each ignores the other (and continues to function in blissful isolation), that each treats the other's theory as the product of a pathological weakness or an inadequate upbringing (and each continues to function in a condescending isolation), that each heaps ridicule on the other (and continue to function in an aggravated isolation), and so on. I suggest that none of these strategies is entirely productive and that at best they lead to our missing the opportunities that diversity affords.

Getting over epistemology

The form of expression "if X then Y" exemplifies our natural causal way of understanding. It shows how easy it might be to come to see our understanding of things as purely a product of our theories. I suggest that it is more helpful to do the opposite and see our theories only ever as a product of our natural way of understanding. This notion is not new (see Schopenhauer (1891), for example). In this paper's view; a theory is more fruitful, more productive, if it is treated as the expression of our understanding, unfolding in a process of interaction, where objects suggested by theory are the "things" that populate our discourses, and where these discourses are the "practices that systematically form the objects of which they speak" (Foucault 1989, p49). In this view, these "things" are always in play, being defined in use, and persisting in use, otherwise lacking both substance and meaning. The

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unhelpful consequences of privileging theory are all factors that drag on this play, that serve to hold it back.

This paper is not a critique of theory, or of our natural way of understanding, or of the natural human desire for explanation. I take it that theory is indispensable and that our natural way of understanding is unavoidably what it is. What this paper criticises is the way that theory risks being treated if we privilege it, and the cost to us all when we do. I suggest that our collective resources would be better used if the space in which we conduct our theoretical discourses were *treated less like hallowed ground and more like a playground*, a secular space where all theories and perspectives were welcome. Regardless of any differences in our theoretical positions we have at least one thing in common and that is that we are all subjects, observing agents, with the potential to share material experience, so I would attach one condition on entry to this space; that each participant in the play *identify the substance that indicates the possibility of the existence of the objects of their analyses and explanations*.

If we are to know any "thing" (about any phenomenon that can be objectified to whatever extent possible) then we are, I suggest, compelled by our natural desire to understand, and our causal way of understanding, to theorise, and our theories will be, and always should be, attacked and defended with vigour. I suggest however that there is more value to be had in doing so in the spirit of play, and by letting go of our epistemological concerns. Theories, in this paper's treatment, are our tools and toys, the kit that we bring to the game. They are there to enhance performance and enjoyment, and to be utilised as long as they prove useful or entertaining. They are there to be run, reviewed, revised, recycled and reused.

The proposition that we treat theory in the spirit of play is not new. J. L. Synge (an applied mathematician and physicist) put this same proposition when he said:

> "When we play, we do not ask why we are playing – we just play. Play serves no moral code except that strange code which, for some unknown reason, imposes itself on the play.... And as for the strange moral code observed by scientists, what could be stranger than an abstract regard for truth in a world which is full of concealment, deception, and taboos? … In submitting to your consideration the idea that the human mind is at its best when playing, I am myself playing, and that makes me feel that what I am saying may have an element of truth." (Synge 1958, pp41-2)

If we admit even the suspicion of "an element of truth" in the proposition that "the human mind is at its best when playing" then perhaps we can permit ourselves to approach our theories in the spirit of play. If we do, then I suggest that our play's "strange code," the rules of the game, can be found in a commitment to a systematic and auditable method, and a disciplined and critical discourse, founded on material evidence and a shared practice. By privileging method as a shared practice rather than theory as a transcendent explanation we make a break from theory-privileged epistemology, we get over it, and we treat our understanding independently of any a priori, transcendental or universal preconditions of knowledge (after Habermas 1988, pxiv, for example). Theory is then free to function as an organising principle rather than an explanatory one, making it possible to give substantive answers to questions that can only ever be formulated and tested in the context of a theory's explicit presuppositions, its objects and their interrelations, and the material evidence used to warrant claims that its objects exist.

A suggested treatment, a possible cure

Rather than privileging theory over method (as, I suggest, we presently do) I propose that we do the reverse and privilege method over theory. Rather than making method the means to theory's end, I suggest that we make theory the means to method's end. Method's end, in this paper's treatment, is a shared practice (as suggested by Miles and Huberman 1984, for example) that is based on the

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systematic and auditable analyses of substantive evidence, one that values our theories as recyclable principles for identifying and organising, rather than explaining, the objects that populate our discourses.

The benefit of adopting such a posture towards our theorising and the epistemological status of our theories' "things" is that rather than devoting our energies to the question of the transcendental truth of any given explanatory construct and its objects we simply get over feeling the need to ask the question. By getting over any commitment to a transcendental explanation we need no longer be concerned with the truth of any theory outside of its own logical "universe."[9] Logical and aesthetic measures of a theory's worth, like coherence, comprehensiveness, consistency, simplicity and beauty would remain, but the question of a theory's transcendental truth (regardless of how we may wish to define it) would not arise. Theory's explanations would remain in play as organising principles, there for the purpose of systematically identifying, describing and organising the objects of our analyses with respect to one another. That is, we would value a theory's explanatory power less than we would its usefulness as a principle for describing and organising its collection of valued things. We would thus avoid the unhelpful consequences of privileging theory and begin to build a critical and shared vocabulary with which to test our theories in a shared practice.

The choice to privilege method and to get over any commitment to universality, transcendence, metaphysics, or exclusivity implicates another reversal, this time with respect to a quality closely related to our conventional understanding of what characterises scientific method; the question of objectivity. Conventionally, the objective view is held to be a priori, universally true, and independent of the subject (any observing agent), while the subjective view is held to be that which uniquely belongs to the subject. An interesting implication of the choice to privilege method and get over epistemology is that these positions come to be reversed. The motive for privileging method is that the one thing that agents have in common is their shared ecology and the possibility of their sharing material experience. In this paper's treatment, subjectivity (with respect to material experience) is potentially common for a given time and place. This is not the conventionally held notion of subjective, that of individual agents' unique "points of view." Subjective is used here in the sense of the unmediated material experience of the observing agent (the subject) potentially shared by all subjects in the same place and time. The objection may be raised that there is no such thing as unmediated material experience (as argued in Derrida 2003, for example), which is fair enough.[10] While I take it that experience precedes knowledge, I also take it that once knowledge has been gained it is almost impossible to experience without mediation. This does not argue against this paper's suggested treatment of theory, it is in fact an argument in favour of it. This paper's call for substantive evidence of any theory's objects, evidence of their empirical existence in the context of that theory's universe, is made in recognition of the condition that what the subject experiences is influenced by his existing collection of valued objects and their interrelations. It is not our subjective views that differ; it is our objective views, formed in our particular circumstances and interactions that differ. What makes our "points of view" different is the difference in our objectification of experience, not in our subjective experience. This suggested reversal of the treatment of subjectivity and objectivity is not new. According to Ledger Wood in Runes (1942, p217); in Scholastic terminology beginning with Duns Scotus (1266/74 – 1308) and continuing into the 18th century "objective" designated anything existing as an idea or representation in the mind without independent existence.[11]

Subjectivity then becomes our social datum, the point from which all else is measured. it becomes the common ground (in a local sense) of material experience. Objectivity is then treated as a property of the objectivising agent, the subject. Objects are their descriptions, and those descriptions are unique in

[9] Much as we already do in maths where we sometimes speak of the correctness, rather than the truth, of our assertions.
[10] Although, perhaps, you can get a hint of what unmediated subjective experience is like if you can recall, when climbing stairs without watching your feet, that strange state you experience in the fleeting moment before you trip, and realise there was one less step than you thought.
[11] The switch from a subject-dependent objectivity to a subject-independent objectivity (according to Wood, ibid, p217) began with A. G. Baumgarten (1714 – 1762) who tried to develop an objective account of 'taste' (aesthetics) (ibid., p35).

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their detail and their valuations to the subject.[12] The extent to which individuals' objects "align" depends on their histories, their interests, and their dispositions towards, and motives for, their mutually negotiated meanings of things. The qualities of objective and subjective views are now reversed. Instead of our efforts being directed towards bringing many different subjective views in line with one putatively independent objective view, we now direct our efforts towards setting our various objective views against one another in our play, and testing them on the basis of our shared subjective experience of material evidence.

The cost of executing this epistemological manoeuvre, of shifting our commitment from the truth of theory to the truth of method as a shared practice, is the disciplined attention that we must pay to the question of the existence of our theoretical objects and their interrelations. In effect we transfer our commitment from an absolute epistemology (the question of the transcendent truth of what we know about our "things") to a *social kind of ontology* (the question of the existence of these "things" within a given community). With respect to the question of what constitutes a "social kind" of existence; it must be recognised that these "things" are not real. These "things" would exist only to the extent that; (1) the method used to find and test them was based on a shared practice that was systematic and auditable, (2) they proved to be useful, and persisted in use, (3) they were open to the fullest possible critique, and (4) they were grounded in the material substance of the phenomena that the theory that suggested them claimed to explain. Meeting these commitments is not a trivial exercise and the cost of doing so may prove, for some, to be too great. Under this paper's suggested cure, the price of keeping these commitments is the courage to admit, "I don't know (yet)," and the discipline to build and maintain a critical vocabulary that is systematic, transparent, and grounded in empirical evidence.

An example of this treatment applied

My interest is in the middle-school maths classroom and the question of the possibility of making mathematical meaning there. In the context of my area of interest the treatment suggested here means that I am less concerned with a theory's contribution to an absolute account of learning and development in the maths classroom than I am with what it can contribute to my descriptions of the interactions that obtain there. By describing maths classroom interaction according to this treatment I aim to contribute to our understanding of maths classroom interaction. I do so in the belief that understanding forms behaviour and that, consequently, transforming understanding will immediately transform behaviour. My choice of theory is decided by the richness and lucidity of the objects that it suggests at the observational scale that I want to describe.[13] I am not restricted to the exclusive use of any one theory. In fact I must use multiple, complementary, theories to realise my descriptions. I measure the value of the theories I choose according to their coherence, comprehensiveness and consistency within and between one another, and according to their potential utility (as recognised by our community) with respect to the insights that they afford and the lines of enquiry that they suggest.

My chosen theories[14] come from distinct disciplines. They suit my research needs in that they all "look out" of their domains (as discussed by Hasan 2005) towards the space of discursive interaction and meaning making as their common explanatory root. They are consistent, comprehensive and cohesive in that together they provide rich, lucid and complementary accounts[15] that encompass the function of language, the production and reproduction of social order, and the functions and development of the psyche. My aim is to draw on objects that these theories suggest in order to describe the natural

[12] So that the subject and object are no longer opposed, but are a unity as per the note above regarding the 18th century switch in definitions of 'object.'

[13] That is, at the scale of individuals (teachers and learners) in interaction in the maths classroom in the course of entire maths periods

[14] My chosen theorists happen to be Vygotskii (who accounts for the psychology of learning and development), Bernstein (who gives an account of the production and reproduction of social order) and Halliday (who accounts for language as a semiotic resource).

[15] Complementary accounts are discussed by Bohr, N. (1961). Atomic physics and human knowledge. New York, Science Editions., and Clarke, D. (2001). Perspectives on practice and meaning in mathematics and science classrooms. Dordrecht, Kluwer Academic Publishers, for example.

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occurrence of discursive interaction in a particular but well recognised setting for the learning of school maths – the "maths period," held in a maths classroom.

By privileging method, I am obliged to make my analyses transparent and my objects' descriptions open to the fullest possible critique. I must justify my analyses both in terms of the objects that my chosen theories suggest and in terms of the material substance of natural maths classroom interaction. By privileging method, I commit myself to establishing a plausible link between that which is general (my chosen objects) and that which is particular (instances of natural maths classroom interaction) by providing an argument in support of the validity and reliability of my objects' descriptions and their operationalization on the basis of my analyses of naturally occurring classroom interaction. The purpose of these descriptions is to contribute to a critical vocabulary of "things" and their interrelations that can be used in our professional and academic discourses in a continuous process of theory testing and recycling aimed at transforming our understanding of the possibility of making mathematical meaning in an institutional setting.

As an example of the application of this treatment, consider the notion of the zone of proximal development. If ZPD is taken to be a feature of discursive interaction (as suggested by Meira and Lerman 2001) rather than a feature of the individual psyche then, under the treatment suggested here, I value it less as an absolute account of the development of the psyche than I do as a critical means of identifying material forms of classroom interaction that might indicate the possibility of its operation. ZPD then becomes what it was perhaps originally designed to be, a discursive object in our professional and academic discourses, a name for a collection of valued objects and their interrelations in an organising principle aimed at a disciplined and transparent description of maths teaching and learning in an institutional setting aimed at pupils' learning and development. That is, ZPD becomes a discursive object in the sense of a shorthand label for an ensemble of persistent material features that have been objectified on the basis of both the theory that suggested it and the observation of the substance of natural classroom interaction – it becomes an object supported by the evidence of material examples that indicate the possibility of its operation, or not (as the case may be). With respect to the question of the existence of the objects that realise ZPD; its definition and material examples are always provisional; the object ZPD (or its description at any given time) remains in play only as long as there is plausible evidence of its operation in the social situation with which it is concerned.

Authority, purpose, and ethics

Epistemology has a tradition (in the West at least) that spans twenty-six centuries. It dates from teachers such as Pythagoras of Samos, who gave us that celebrated theorem and promoted the notion that our souls are immortal (Curd and McKirahan 2011, pp24-6),[16] Xenophanes of Colophon and Parmenides of Elea (who were early monists) (ibid., p55), and the sophists (Protagoras of Abdera, for example, who said that "many are the things that hinder knowledge: the obscurity of the matter and the shortness of life" (ibid., p146)),[17] all of who preceded Socrates, Plato and Aristotle[18] (ibid., provides a sampler of presocratic thinkers). Even at that time the nature of knowledge was beginning to divide along fault lines. The Pythagoreans, for example, eventually split into two groups, the mathematikoi, who sought knowledge through reason (logical proof, for example) and the akousmatikoi, who preserved and propagated knowledge through an oral tradition (by passing on their master's teachings) (ibid., note, p23; item 11, pp26-7). Regardless of the kind of knowledge with which the Pythagoreans (and every philosopher since then) were concerned, a common theme throughout their enquiries into what counts as knowledge and what it is possible to know, is that knowledge concerns action, and that the purpose of knowledge was to inform activities that constituted a "proper life." Even in this small

[16] (DK36B4; 31B129; 14,1; 14.8a; 58B4; 14.8) (Diels and Kranz (DK) numbers are used to track ancient testaments and fragments of recorded pre-Socratic thought.)
[17] (DK80B4)
[18] Socrates, Plato and Aristotle are the more commonly known "big-hitters" of ancient Western philosophy.

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sample, one that spans just a few centuries of speculative thought, epistemological differences had formed over questions of the "author" of true knowledge. For Xenophanes true knowledge was beyond the reach of human understanding (ibid., pp34-5),[19] for the mathematikoi it resided in the reasoning subject, and for the akousmatikoi authority resided in the celebrity subject (their venerated teacher) (also see note 1, ibid., p23). These fault lines remain, and over time they have multiplied. As researchers we are bound to take a position with respect to epistemology and ontology, that is, we must make clear our position with respect to theories of knowledge (epistemology) and the existence of the "things" with which our research is concerned (ontology). I suspect that epistemological and ontological questions like those set out above will not be resolved any time soon and that consequently, in the mean time, we are free to choose the basis on which we wish to proceed with the conduct and communication of our research.

The choice that this paper promotes addresses authority, purpose, and ethics by calling for a conscious choice to privilege method (as a shared practice) and the treatment of theories and their objects in the spirit of play. This requires that we reverse (what this paper considers to be) the conventional value positions held by theory and method by privileging method and by treating theory as a recyclable source of things, and, that we reverse (what this paper considers to be) our conventional understanding of subjectivity and objectivity by treating subjective experience as the closest thing we have to a shared datum and by treating objectivity as the property of the subject (as an individual and purposive agent). This position addresses purpose, authority, and ethics by vesting authority in the subject; the proviso being that each and every subject (including, and this is most important, the researcher's object-subjects, that is, the subjects that are the researcher's objects of interest) in interaction with their particular community, in their particular ecology, is accountable for the question of what constitutes a "proper life."

Making the choice to privilege method over theory by getting over epistemology and focusing on a social kind of ontology does not erase epistemology, it simply responds, in an ethical way, to what is taken here to be a set of open questions regarding the nature of truth and objectivity. This paper is not theorising, nor is it promoting any one theory over another. It is simply recognises that we are bound to position ourselves with respect to our theories' epistemological and ontological status and responds by putting forward an argument that (1) we are free to choose what that position is, and (2) that by choosing to get over epistemology we are making an ethical choice. The choice to commit to methodology as a shared practice will, I suggest, lead us to recognise research ethics that privilege the subject over the object, and the choice to get over epistemology and focus on an ontology that admits both the social and the natural aspects of experience will lead us to recognise research ethics that privilege doubt over certainty, questions over answers, and descriptions over prescriptions.

By privileging the subject we create a secular space where we can test our theories, we create a space where all players' contributions and points of view are welcomed and respected to the extent that they *indicate the objects of their explanatory principles in the substance of the phenomena that they claim to explain*. This condition on entry to the game, which grounds the game in empirical evidence, is not new, it has its roots in the tradition of scientific method. What is (perhaps) new is that this clearing would be a space where *we would always be improving rather than proving our theories*. More importantly, it would be a space in which to *test and transform our own understanding,* not only of our theories and those objects that we deem to be worthy of our attention, but also of our motives in choosing those particular objects in the first place. At the same time we would be mitigating the risks associated with the unhelpful consequences of privileging theory, such as ZPD being used (with the implied authority of Vygotskii's good name) as a catch phrase or slogan in our professional and academic discourses.

By choosing to get over a theory-privileged epistemology we are free to *treat theories as recyclable sources of the things that we talk about* when we talk about what we do. By choosing to privilege the truth of method as a shared practice we are free to *treat theory as an organising principle rather than*

[19] (DK21B/18, 23, 24, 25, 26)

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an explanatory one, as a means of establishing and maintaining a critical vocabulary of "things" and their interrelations, as recyclable sources of the objects that populate our discourses on the teaching and learning of school maths.

> "When you know a thing, to hold that you know it; and when you do not know a thing, to allow that you do not know it; – this is knowledge." (Confucius, in Legge, the analects, bk2, chXVII)

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