Creative and Critical Thinking

An Evaluation of Philosophy for Children

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PREAMBLE

This paper is a curious mix of the theoretical and pragmatic. The theoretical question I will be addressing is that of the distinction between critical and creative thinking, and whether we can, in principle, draw up firm guidelines on a distinction. The pragmatic question is the question of the appropriate techniques for evaluating Philosophy for Children (P4C). These two apparently disparate questions are interwoven in this paper, and I begin with a preliminary guide to this interweaving.

P4C is a programme originally devised by Matt Lipman in the United States 20 years ago, in which children are taught reasoning and thinking skills through dialogue; that is, through the discussion of philosophical topics. I shall take this as a definition of the aims of P4C with respect to which I assess the evaluative procedures used.

In Australia, P4C has been widely accepted although there have been few quantitative or qualitative studies of its impact within the country. However, educational innovation is increasingly required to justify itself. The Australian Council of Educational Research is most concerned that P4C, which it sponsors, prove itself. The pre-ferred justification from the point of view of the bureaucracy is results, whether quantitative or qualitative, statistical or ethnomethodological. If P4C is to survive, here and in the rest of the world, it needs results.

In the educational literature, there is a distinction drawn between testing and evaluation. Testing is an activity performed on students, in order to assess their skills (e.g., for entrance to a high school). Evaluation may involve precisely the same tests (on students) but its purpose is to evaluate not the students, but the teaching or programme involved. All testing in P4C has been evaluative, as far as I know. However, the practices of evaluation have skewed the attitudes towards teaching as if testing were involved.

There have in fact been a range of results using a test devised in the United States — *The New Jersey Test of Reasoning Skills* (NJTRS) which are quoted very widely. A point which is constantly made about that test is that it shows the P4C programme emphasises critical thinking at the expense of creative thinking. The method of evaluation is taken to specify the intent of P4C — and is then used as a critique of the programme in general.

We cannot dismiss too readily critics of P4C who base their judgement on the failings of the NJTRS. If there is a method of evaluation of a programme which is cited and used, it is natural to see it as reflecting the aims of the pro-

gramme. Moreover, how we teach P4C will inevitably reflect the strategies we use to evaluate its impact. (This is known technically as the "washback validity" of the testing procedure.)

In this paper, my strategy is to consider the advantages and disadvantages of a variety of techniques for evaluating P4C which have emphasised the critical (Section 1) and creative (Section 2) aspects independently. I believe these techniques mistake the force of the distinction between critical and creative thought. After a survey (Section 3) of explicit and implicit accounts of the distinction between critical and creative thinking, I turn to Lipman's own version of the distinction (Section 4). I then return to the question of evaluation for P4C. I advocate analysis of the discourse of the P4C classroom, and speculate that a full analysis of that discourse will better enable us to see the distinction.

SECTION 1
Tests of Critical Thinking Skills

Virginia Shipman's *New Jersey Test of Reasoning Skills* has been associated with P4C since the mid-1970s. It was developed specifically for *Harry Stottlemeier's Discovery*, the first of the novels developed by Lipman — concentrating, eponymously, on Aristotelian Syllogistic, and informal reasoning. It has been a very useful test for assessing certain skills developed by children in studying *Harry*.

It is in terms of the NJTRS that we have obtained such evocative results as those quoted by Lipman describing the development of reasoning skills. It appears that in the United States, over some 10 years of testing with large numbers of participants, children who do not do any training in P4C improve their scores on the NJTRS until roughly Grade 6, then stay steady (or decrease in score) through high school. The improvement at the so-called Year 13 (university entrance) level is illusory, since only matriculants were tested. (Lipman, 1985)

Students who had studied P4C improved steadily through high school, and improved one grade level in scores on average, for each year of P4C until, in principle, most achieved well nigh perfect scores. The formula Lipman gave in lectures was that each year of P4C takes students one-quarter of the way from their current score to 100%.

This evidence is a clear example of how evaluation can be used as an argument in favour of a programme. Moreover, the standardised scores give a baseline for comparisons with control groups. Other evidence shows that performance in the NJTRS is a reliable indicator of performance at university, and that it correlates with standardised tests of reading and arithmetic skills, and tests of reasoning, like the Cornell Test.

The advantages of the New Jersey Test should be apparent. As a quantitative measure, it is easily understood and is readily correlated with other forms of psychometric testing.

The test also provides a baseline for studies of P4C in the classroom. In Canberra, several years ago, I introduced *Harry* to high school girls who were having difficulties with algebra. (Slade, 1989) The thought in the study had been that the solution for difficulties with algebra was not to avoid abstraction and send the 13-year-olds back to cutting up paper models of pies into fractions, but instead to introduce the use of variables through syllogistic. I should never have been allowed to set up the study (then) without a "test" I could administer for evaluation.

The usefulness of the NJTRS goes beyond its mere existence. In a later study of young bilingual children's reasoning skills, I also used the test, for pre- and post-testing in a school in Brussels (Slade, 1990a). The methodology is extremely simple. There were at least two classes at each grade level in the International School which agreed to my project, and we took one as control. I — and teachers I had trained — taught the experimental group P4C. We did not necessarily use *Harry*, but chose a suitable text, depending on the age level. All of the classes had only roughly 30% English mother tongue; with 80-90% functional bilinguals in each class. Each class was pretested with the NJTRS. In general, results were equivalent between the groups. On the whole, classes were roughly one grade level behind their United States peers. After only 10 weeks of P4C we had extraordinary changes: the experimental groups moved up to a year ahead of United States norms whereas the control stayed a year behind United States norms. This pattern was repeated over several years, with a range of teachers and some 40 classes in all, so that it seemed perverse not to look for an explanation of why such changes occured.

I cite this example both to emphasise the usefulness of NJTRS and to raise the question: what is it that the NJTRS tests? The skills that are being tested are evidently dependent on a group of a particular fragment of English — the logical operators — ('follows', 'therefore', 'so', 'or', 'if ... then', 'only if ... then', and so on). Using the logical operators properly is a fundamental skill: indeed I think their grasp is often the core of definitions of "critical thinking skills." In my search for an explanation of the extraordinary results in Brussels, the best explanation was that ESL/ TESOL programs fail signally to teach the logical fragment of English fully. Playground and even classroom use of "only" may not ever make it evident that "Only tall kids play basketball" is truth conditionally equivalent to "If kids play basketball, they are tall." P4C had its effect in part because it makes explicit the use of the logical operators, and trains students in how to use them.

However, as a conception of critical thinking, the NJTRS is extremely thin. The arguments are disembodied, or, to use a word from the literature, "disembedded." Curiously, for a programme seen as fundamentally opposed to Piaget, the conception of reasoning/critical thinking skills is Piagetian in that the conception of reasoning is of an abstract skill, reducible, possibly, to logical formulae. The Piagetian methodology of setting tests to establish the intellectual capabilities of children frequently fails to make vivid for the children just how questions actually apply.

Experimental evidence (Bryant, 1974, and others, summarised in Boden, 1979) suggests the failure of children correctly to answer questions may be associated with the oddity of the questions, rather than with the logical form. The children do far better when asked questions which are more likely to be asked, or questions which are "embedded" in a familiar and comprehensible setting. The measure of skills acquired by students working in P4C is given by the results on a fairly narrow range of disembedded questions. This is compatible with an account of the development of reasoning skills which sees the exercise of the abstract logical skills as its aim. Philosophy for children, however, aims to develop critical thinking skills through dialogue, or discussion. The disembedded testing measures only a subpart of those skills.

This is not to say that children should not acquire the ability to abstract and see the common structure in argument forms. Indeed these skills

are essential to critical thinking, and the process of generalising to different cases is one which is encouraged by the manuals. However, the NJTRS tests those skills in a narrow context. It is also self-confessedly narrow in its scope: it tests syllogistic skills, disambiguation, causal fallacies and certain forms of analogical reasoning. Yet in the manuals of the Philosophy for Children programme the critical skills that are exercised go far further; from the skills of formulating relevant questions and identifying what is being said, and classifying members of a class as similar, through finding assumptions and inferring to evaluative skills, such as criticising ideas constructively and adjusting ideas in response to criticism.

This range of critical thinking skills is mentioned by Lipman (1975, 1988; see also Splitter). Critical thinking skills include all the skills which are involved in connecting and organising ideas.

Analysis involves:
- identifying what is being said
- distinguishing what is relevant from what is not
- seeing connections between different strands of thought
- recognising vagueness and ambiguity, then clarifying terms
- identifying members of a class, in terms of likenesses
- identifying counterinstances, as different in some respect
- identifying analogies

Inferring involves:
- drawing out the consequences of what is said
- identifying underlying assumptions
- generalising from particular instances — i.e., abstracting
- applying analogies to reach new conclusions
- recognising cause/effect relationships

Evaluation involves:
- giving reasons for beliefs and decisions and then choosing how to act
- criticising ideas constructively
- modifying ideas in response to criticism — and on it goes.

This view of critical thinking skills is not unique to those working in P4C; we find Schlect saying: "critical thinking abilities are ... whatever skills are required to recognise, analyse and evaluate arguments" (1988 quoted by Splitter). The skills are extremely broad-ranging and utterly fundamental. No child learns to walk and talk without acquiring the ability to recognise cause/effect relationships, to classify and identify likenesses and to grasp what follows from actions or utterances. In doing so they are using critical thinking skills.

All these skills are grounded in both the cognitive and the affective aspects of people. In the literature of P4C, these aspects are seen as complimentary: just as our thoughts affect us in various ways, so our feelings may be rationalised in various ways. In recent terms, some, but not all of the critical thinking skills would be labelled "metacognitive:" they involve thinking about thinking. Such metacognitive skills are called "higher order thinking skills" by Lipman.

Even with respect to critical thinking skills, the NJTRS cuts far too narrowly, with disastrous consequences for washback validity. The conception of critical thinking skills in the test is one which would encourage a P4C teacher to run a sort of linguistic math lesson or a logic course of the least interesting sort. Yet the conception of critical thinking in P4C is one in which a wide range of skills are used reflectively in discussion. P4C trains children to listen and examine their own and others' ideas critically — and the NJTRS tests only one minor component of those skills.

SECTION 2
Tests of Creative Thinking Skills

In an IAPC booklet, the claim is made that the experimental results from Pompton Lakes, New Jersey, in 1976-77, established that the programme fostered creative thinking. The booklet says: "The results suggest that logical and intellectual creativity are not mutually inhibitive and both can be sharply stimulated by the same program."

I share the belief expressed in this claim, but am skeptical about the testing used to establish the claim. They quote a $p < .001$ correlation between exposure to P4C and "ideational fluency" and "divergent thinking." These two notions are operationalised in terms of the number of different ways an object or set of objects can be classified. The sorts of questions asked are ones like:

"What can it be¿" or,

"How many ways can you classify these objects¿" or,

"How many reasons can you think of for doing this¿"

This pattern of testing for creative thinking has survived into the '90s. The new *Iowa Assessment Package for Evaluation* (*The Creativity Domain*, 1990) reads:

> *The rationale behind this measure is to provide a thought-provoking situation appropriate to the ability and experiences of the students to be assessed and have students write as many pertinent and imaginative responses to the situation as possible. The number of such responses will provide a clue to their overall creativity. This test is designed to assess creativity by examining two factors; the number of questions asked and the quality (and/or uniqueness) of those questions and statements.*
>
> *There are three activities which together will help to assess student creativity. Students will be instructed to ask questions, guess causes and predict consequences relative to the situation statement.*

What is striking about this model is that the activities through which it aims to test creative thinking might have been taken from the lists of critical thinking skills Lipman has elaborated. This is not, I think, a coincidence. The process of testing creative thinking skills frequently relies on the activities we typically engage in critically.

The Iowa tests use number of responses, and quality ("P" for unpredictable gets 3 points). These measures are similar to those used in the Pompton Lakes Experiment and, surprisingly, to those used in claims made about the cognitive advantages of bilingualism, an area in which I also attempted quantitative research.

In the literature on bilingualism there is a sharp distinction drawn between "additive" bilingualism, in which there is a cognitive advantage due to the second language acquisition, and "sub-

tractive" bilingualism, in which the language brings a cognitive cost. Additive bilingualism is more likely to occur when parents are of high SES and the mother tongue has high status. In a wide range of cases, additive bilinguals' performance in reading, writing and mathematical tests was shown to be higher than that of their monolingual peers, with whom they had been matched for IQ at kindergarten level. In explaining this phenomenon, linguists have given evidence that bilinguals have enhanced "linguisitic flexibility." This is operationalised by reclassification tests, resembling those mentioned above, semantic flexibility tests and symbol substitution tests.

As part of a series of studies on bilingual education and P4C, carried out in Australia and in Brussels, I adapted versions of these tests. Unhappy with many of the so called "semantic flexibility" tests, I added an exercise taken from *Kio and Gus*. The symbol substitution test was a direct adaptation from those in the literature, in which children are invited to imagine that, for instance, "hot" means "cold," then asked whether to turn on or off a heater when told "It's hot."

When a comparison was taken of a control group, bilinguals and a group who had studied P4C for one term, all of whom were matched for IQ, the bilinguals outperformed the control on all tests, but were outperformed by the philosophy group on all but the symbol substitution tests. The result is tantalising: it suggests that bilinguals have the ability to substitute expressions within a language in a systematic fashion. Indeed, the skills are similar to the use of variables in the abridged Aristotelian system I use when teaching *Harry*. The skills involved abstraction, and dissociation of surface form from meaning: skills we think of as paradigmatically critical skills.

To make a brief aside, I speculate that there is a link between symbol substitution skills and the extraordinary results I had in Belgium. In the last year working in Brussels, I had groups of Grade 2 children (6 and 7 years old), working on syllogistic. They loved looking for new valid forms, and were delighted to be able to write a long sentence like "All lizards are reptiles" as "All A's are B's" or "All L's are R's." Their orthography was weaker than their logic. The ability of these young children to cope with the limited level of abstraction of the Aristotelian system (which

does not have the added difficulty of using variables for propositions or predicates) might be related to an ability to abstract from the linguistic form evident in symbol substitution. To the extent that the evaluative procedures raise such speculative ideas, they have a function.

In terms of the distinction between creative and critical thinking skills, tests of creative thinking skills are unhelpful. The test of symbol substitution skills is strikingly similar to tests of analytic thinking skills; the exercise from *Kio and Gus*, involving classifying senses of "right" and "wrong" and deciding whether these senses should be counted as the same or different is equally "critical." Even the reclassification tests operationalise a skill which, while it may not be taught in an arithmetic class, is a paradigm of reasoning.

The tests of creative thinking skills, like the NJTRS, concentrate on the responses of individual children under test conditions. This, again, is inimical to the practice of P4C in teaching thinking skills through dialogue. Nevertheless, there is an important part of our conception of creative thought which suggests that creativity is a solitary matter. It is to our conception of the creative that I turn in the next section.

SECTION 3
Critical and Creative Thinking

"Critical" is frequently used as a derogatory adjective, which is opposed not merely to "creative" or "fertile," but also to "pleasant" or even "mannerly." "Creative" on the other hand, carries with it images of Beethoven tearing his hair, or Einstein's revolutionary way of "seeing" the Michelson-Morely experiment. Creativity is assimilated to emotional freedom, the critical to the inhibited.

It is not for me to trace the origins of such assimilations. My strategy will be rather to consider a range of cases we take as clearly creative and assess whether these cases show critical thinking to be incompatible with creativity. I begin with creativity in mathematics and science, then turn to what I shall call the "recombinant" model, then to the romantic conception of creativity as self-expression and finally to the relationship between rule-following and creativity. I suggest that there is no incompatibility between critical and creative thought.

Creative thinking very often consists in critical thinking done particularly well. Consider for instance a creative mathematician or scientist or possibly philosopher. The hallmark of creativity in these domains appears to be the ability to identify an interesting and important statement, prove it if true or construct a counter example if false. Production of the counter example has the character of constructing a possible world within the relevant domain. Mathematicians, that is, find proofs, showing how a mathematical statement follows from axioms and rules of inferences, or construct dispoofs. Scientists test interesting scientific generalisations, test them against the evidence, and then reject or confirm the hypotheses. Confirmation involves the construction of "experimentally contrivable circumstances," a sort of scientific possible world. Rejection may involve a disproof or counter example. Arguably creativity in philosophy involves a process with a similar structure: the creative philosopher identifies beliefs of great importance, analyses the concepts to show their force and truth or constructs counter examples — thought experiments to reject those beliefs. This view of creativity is due to Neil Tennant.

This "proof theoretic view" of creativity is a narrow view of philosophical activity and, possibly, of scientific and mathematical activity as well. It is, however, broadly true to a number of accounts. It explains creativity in science, mathematics and philosophy as involving the interweaving of rigorous deductive skills and insight and imagination in the construction of proofs, or chains of inferences. There is no distinction between the objects of mechanical thinking in these areas, and those of the fertile imaginative processes: what is here called proofs. The metaphors associated with the process of discovery are those of the enquirer searching out preexisting features, of being driven by a chain of reasoning, or a chain of inferences.

These metaphors are not unique to scientific or mathematical enquiry. We find them in history, but also among architects or designers, who speak of searching for the "solution" to a design problem, and being forced to create a design in a certain way. The metaphors may appear to suggest a straightforwardly realist account of the various domains, in which the proofs or solutions drive us in a certain unique direction just because they are means for arriving at the truth. However, it is consistent with these metaphors

to conceive of truth as a construct emerging from the proofs, or solutions we impose on reality. The proof theorist about creativity may think of the world of mathematics or science as something created in the process of "inventing" proofs, so that reality is defined by, rather than preexisting the proofs. (This is one account of the views of the later Wittgenstein on mathematics).

The essential point is that for the proof theorist about creativity there is no difference in kind between creative and critical thinking. In both cases, there is a search for proofs, and construction of possible worlds which are tantamount to ways of spelling out the consequences of beliefs. The essential skills are those of inference, deduction and analogy (for the production of counter examples). There is no separate skill which is engaged as one moves from the critical to creative gear.

The proof theorist, then, does not give any particular force to the ability of creative thinkers to "see" the world differently from others. Yet that ability has often been thought of as the hallmark of creativity. In a range of disciplines, we find a view of creativity as the reinterpretation of theory in the light of ideas drawn from another area or problematic. So, Arthur Koestler talks of creativity as a consequence of the superimposing of models from one sphere to another, with an entirely new vision as a result. He says:

> *The creative act is not an act of creation in the sense of the Old Testament. It does not create something out of nothing; it uncovers, selects, reshuffles, combines and synthesises already existing facts, ideas. ... Man's knowledge of the changes of the tide and the phases of the moon is as old as his observation that apples fall to earth in the fulness of time. ...Yet the combination of these ... in Newton's theory changed man's outlook on the world"* (The Act of Creation, 1975).

This view I shall label the "recombinant" view of creativity, after a classification used for soap operas. Todd Gitlin, in his book, *Inside Prime Time*, describes new soaps as "copies," "spin-offs" (*MadMax II*) or "recombinants." Some recombinants may be merely mechanical (*The Harlem Globetrotters on Gilligan's Island* was his example

of a soap that thankfully never reached our screens), others may be genuinely creative. Gitlin says, in defense of the recombinant: "… recombinant thinking is rooted deeply in all modern culture and thought … the strategy of collage, of juxtaposition, is both recognition of and romantic protest against the idea that the world is finished, worn out." He cites Eliot's *The Waste Land* and Barges as recombinant thinkers, but goes on to talk of the role of the recombinant in the network boardroom: "…recombinant talk is splendidly practical, too, providing signposts for rapid recognition, streamlining discussion that might otherwise seem unwieldy."

The metaphor of recombination is one which essentially demystifies the creative process, while emphasising its value. For the ability to see afresh, to reinterpret reality, is decomposed into abilities to understand two or more areas as others do, and the ability to superimpose those understandings. There is nothing in those two subroutines which cannot be subsumed under critical thinking: the creative thinker sees what follows from the juxtaposition of ideas.

We can trace the notion of recombination as creative further back than the moderns. In his biography of Pope, Maynard Mack talks of the humanist poets for whom "the beginnings of creativity lay not in some solipsistic Cartesian cogito or other version of the Narcissus myth, but in a 'double groping' — both towards the 'otherness' of the ancient text and towards the modern sensibility, a personal voice to mediate it" (1988:140) Here we have a slight variant on the conception of recombination: reinterpretation through a personal perspective. In this case, too, there is nothing inexplicable about the creative process: neither in having a personal voice, nor in "groping" towards the otherness of the ancient text.

The process of seeing afresh through superimposing ideas is often described in more cataclysmic terms — as a paradigm shift or gestalt change. Exemplars of this view can be found in familiar discussions of incommensurability or in the Kahn of *The Structure of Scientific Revolutions*. Characteristically, metaphors are used to describe creation: "shifting the paradigm" which assume that the process is by definition irrational, uncritical. These are possibly the most persuasive of the metaphors dominating our image of creativity, and have fed into the third view of crea-

tivity. This I shall call the romantic view. It was elaborated most characteristically in the nineteenth century. Inspiration or creativity in the romantic view may be associated with what Mack disparagingly labelled the "solipsistic Cartesian ego or other version of the Narcissus myth". It is often also associated with a Muse, with creation being "driven" from outside the self, as with the proof theorist.

The metaphor is elaborated in Wittgenstein, in his remark: "Within all great art there is a wild spirit: TAMED." The imaginitive self is creative by virtue of constraints — whether self imposed or internal. Ray Monks quotes, in his new biography *Ludwzg Wittgenstein: The Duty of Genius*, Wittgenstein's discussion of his design of a house for his sister in Vienna, that it "is the product of a decidely sensitive ear and good manners, an expression of great understanding (of a culture, etc.). But it lacks primordial life, wild life striving to erupt into the open — that is lacking" (1990:240) The image is of a genuine creative artist bursting forth with uncontrollable inspiration, unfettered. Yet in the case of Wittgenstein, the unfettered inspiration was also highly critical.

While romantic views have been associated with the view that it is not possible to be both critical and creative, at no stage do they establish that the two are incompatible. Indeed, I suspect the thought that they are incompatible may have as its basis the observation that people who are very creative in one area — art, mathematics, music, chess — are uncritical, in the sense of being undisciplined, in other areas, such as their management of financial affairs. This view is a muddle: being creative in chess may leave someone with little time for other matters, but it does not mean they are uncritical in chess, only that they are uncritical about other matters.

It is certainly true that no amount of critical thought can guarantee creativity. Analytic skills might encourage innovation, but they cannot ensure it. But we can grant all this, while still claiming that creativity actually requires intense critical thought. It is no part of the definition of critical thought that it yields an algorithm for finding new solutions. It is the lack of guarantee and hence the felicitous nature of true creativity which is at the heart of the metaphors of Muses who assist creation or of the wild animal within which is unleashed in a genius. It is not to deni-

grate those metaphors to suggest that they have been taken too seriously and literally by those who feel that anything but a wild animal or a Muse is uncreative. Creativity is surely more various than that.

A second claim of the romantic view, that creativity is essentially "solipsistic," is compatible with most views of critical thought, which are also, in this sense, "solipsistic" insofar as they describe thought as the product of individual minds working in isolation. We could interpret it as a claim that communal methods of argument and ratiocination in groups are not appropriate for the creative mind. Again, there are a series of classic images which inform the claim: Beethoven conducting while deaf, for instance, is an image of a creative spirit literally out of time with the duller musicians around him.

We can accept that much innovation — like critical thinking — is done alone, while arguing that interaction encourages creativity. At one level, there is the "brainstorming" model for creating new ideas, in which the process of innovation is seen to be crucially dependent on interaction. In this sense, it is possible that creativity is fostered by dialogue. On another level, we might argue that it is only by reference to common standards and beliefs that creativity is defined: it cannot be too "solipsistic" without making every mundane thought trivially creative the first time any particular person has it.

On both counts, then, the supposed incompatibility between critical and creative thought of the reconstructed romantic view is not established. Even if critical thought cannot guarantee creativity, we have as yet no reason to believe it hinders creativity. The requirement that creative minds are "solipsisitic" does not itself distinguish critical and creative thought.

Wittgenstein is often also associated with another view of creativity: the creative thinker is one who can go beyond the rules. However, as Wittgenstein himself has made us aware in the *Philosophical Investigations*, rule-following behaviour can be unexpected: it depends on the formulation of the rule. We might think another is following a rule of adding 2, and accuse them of breaking it when they start adding 4 after 1000, but their rule might be "Add 2 until 1000, then 4." Wittgenstein's point is generally taken to be that we cannot introspect the rules we follow: we can only attribute them on the basis of beha-

viour. The creative chess player might feel unlike the mechanical chess player in bucking the rules, but the creative player certainly follows *some* rule in thinking: it is after all chess that is being played. The phenomenology of creativity — how it feels — may well give an impression of rule breaking, or of taming a wild animal. How it feels may not be the best guide to how it is.

From the point of view of the observer of rule-following behaviour, rule-breaking creativity appears to consist more in the ability to recombine rules than in their creation. It is interesting in this regard to report on two papers of which I unfortunately only have hearsay versions. The first is Priest's verbal report of Margaret Boden's paper on computer simulation of creativity. She spoke of creativity as "rule breaking," but gave as her example variations of the computer playing a sonata, with increasing sensitivity of interpretation. The apparently significant changes in the product were due to including a number of small instructions allowing the computer to "obey" the alterations in tempo marked by the composer. What is striking here is that creativity is apparently made up of a complex of minor variations, so that there is no difference in kind between the creative interpretation and the mechanical, but only one of degree.

This model is reminiscent of Rodney Brooks' paper, "Intelligence Without Reason," at the IJ-CAI conference in which a series of images of increasing intelligence in his robots were due to accumulations of minor sensori-motor routines. According to Brooks, this is all there is to the difference between the intelligent and the unintelligent.

The model is illuminating. We think of creativity as unlike critical thought. But it may be a difference of degree, rather than of kind. The accumulation of enough small differences in critical thinking may be sufficient to give the appearance, and indeed the reality, of creativity.

SECTION 4
Lipman's View

*AUTHOR NOTE: This section was written before I had access to **Thinking in Education** by M. Lipman (Cambridge, 1991) on which I comment in a more recent paper.*

Traditionally, in the practice of philosophy for children the notion of the critical is not one

which can be contrasted with creative thinking. The community of enquiry is one in which it is possible to discuss issues relevant to children, derived from the readings. However, not everything children wish to discuss goes, and their ideas are up for critical evaluation. The process of joint critical investigation is no way inconsistent with the play of the imagination, or self expression. When a child gets on to what the dog did last night, members of the group may well ask "Is that relevant?", but the sense of a constraint, far from limiting creativity, makes possible the move from mere anecdote to new ideas. Indeed, children find the constraints liberating insofar as they learn to criticise their own and others' ideas without regarding that criticism as personal.

We all have our own anecdotes to relay on children's creativity in the P4C classroom. The clearest example I have of recombinant thinking comes from a discussion of whether the equator was invented or discovered. One child said "Discovered, it's a real place," another "invented, there's no such thing as a line," and the third "Well the place that the equator runs through is there so it could be discovered, but the idea of a line was invented." As for creativity in the romantic view as self-tortured enquiry: the only case I can think of was a man who phoned me at midnight because his daughter, age 7, would not go to sleep from worry about whether time was real. (She was breaking rules, too. "What's the answer?" he asked in fury.)

Creativity, far from being incompatible with critical thought, is a product of critical thinking in these cases. This is the thesis of the P4C booklet in which the Pompton Lakes experiments are described. It reads: "The conjunction of improvements is important, since the enhancement of critical thinking skills alone can be superficial or empty without enhanced fertility of intellectual production."

This model of the contrast between critical and creative thinking skills no longer identifies critical thinking skills or reasoning skills as drily analytic as opposed to creative. The dichotomy between critical thinking and creative thinking is seen as a false dichotomy; critical should be opposed to uncritical or sloppy thinking, creative thinking to mundane, tedious thought. All good creative thinking should be critical; good critical thought is creative. The archetypal image of an analytic thinker, the pure mathematician searching for a new proof is one of a creative thinker;

the talented visual artist constantly thinks about and criticises their own and others' work. Creativity is essential to good criticism, if not sufficient: criticism is essential to creativity (if not sufficient). Good critical work may not be sufficient for creativity, but it is necessary.

In the light of this model of the interweaving of the critical and creative elements in philosophy for children, it is surprising that Lipman, in a lecture in Mexico last year, was at pains to distinguish the two. He was working with a definition of critical thinking which I quote from his article of 1988. Critical thinking is "skilful responsible thinking that facilitates good judgment because it (a) relies on criteria (b) is self correcting and (c) is sensitive to context" (1988,39). Creative thinking, he said, also relies on criteria, but is not only responsive to the unitary criterion, in the same way that critical thought is. The unitary criterion he mentioned was truth.

Lipman is evidently thinking of creativity only in the artistic context: for creative mathematical and scientific thinking is as responsive to truth as critical thinking in those disciplines. (This point survives a Wittgensteinian account of mathematics, since even in that model we are allowed a redundancy theory of truth, and mathematical statements, once proved, become true *simpliciter*). Even in art and fiction, it is not obvious that some notion like truth will not play a role in describing the criteria by which we judge value. Lipman's argument from criteria — if I understood it, is scarcely a persuasive distinction between two sorts of thinking. It is, at best, a distinction in emphasis.

Creative thinking, Lipman went on, is not self correcting in the way critical thinking is, insofar as a creative thinker creates "a world unto itself," whereas critical thinking is responsive to our world. This contrast will only serve to distinguish critical and creative thought for a realist who believes art and creativity in general are unique in creating worlds, whereas argument merely describes a preexisting world. There are many for whom that distinction is problematic. For instance, Wittgenstein's remarks that mathematical proof define a world were not meant merely to apply to creative proofs: all proofs create a world unto themselves.

Lipman introduces another of the metaphors which dominate our thinking about creativity: the creative thinker "creates" a new world,

whereas the critical thinker reports on a preexisting world. This metaphor, like others which specify the profound difference of creativity from rational thought, is circular: creativity is the process of producing a view that is, by definition, new — that is outside what can be understood from the current perspective, or assessed using criteria responsible to the world. This may not be avoidable, but it makes it extremely difficult to assess.

As teachers of philosophy for children, we need to dissolve the surely irrational, unjustified and uncreative presentation of the dichotomy as of two mutually exclusive processes. If we can show how critical thinking can foster creativity (while not of course guaranteeing it) we have made a step in the right direction. In doing so I return to the discussion of the role of dialogue in creativity.

SECTION 5
Dialogue and Creativity

The evaluation of P4C has as its aim the pragmatic purpose of convincing others of its worth.

The evaluative strategy must reflect a conception of the worth of philosophy for children. One of the difficulties facing P4C is, however, that it does not readily adapt itself to a list of aims and objectives. In part, this is due to the fact that in philosophy for children we aim to develop not a readily specified list of computational skills, but "metacognitive," higher order thinking strategies — that curious combination of critical reasoning skills, judgment and creativity that is so difficult to specify.

We should not see this as a defect in P4C. The very flexibility of the use of dialogue and the community of enquiry in teaching depends on a teacher not entering the classroom with a list of behavioural objectives to be achieved through the lesson. Even for the most mechanical critical thinking skills, the objectives should emerge through the classroom dialogue, and are exercised in that context. Critical and creative thinking skills are "embedded" in the discussion of the community of enquiry, they are not isolable from that context. It should be no surprise if quantitative testing procedures, concentrating on individuals, fails to capture the value of P4C,

since P4C essentially involves interaction.

Vygotsky, whose work in developmental psychology has increasingly come to be set over against that of Piaget, proposes a model in which interaction, or dialogue, allows development of capacities which the individual alone could not achieve. In terms of teacher student relations, the teacher's role is to anticipate and give structures to aid development: to "scaffold" learning. The community of enquiry can be seen as a scaffolding device, in which the teacher increasingly hands over the scaffolding techniques to the students themselves.

Vygotsky argues that it is possible for children to think at far higher levels in a group than they would be able to alone. Scaffolding allows the structuring of thought for the children, in such a way that they can achieve very high levels of thought. Philosophy for Children builds on this insight: it is not a superficial feature of P4C that dialogue is used in the programme. Both creative and critical thinking are encouraged by the context of a structured group, in which ideas are allowed to be spoken out, but are subject to intense critical scrutiny.

In this context, evaluation should concentrate on the processes of dialogue in the community of enquiry, rather than the skills which might be a consequence of that interaction. This is the project on which I began last year, taping and videotaping classroom discussion. The analysis of transcripts of classroom dialogue is not a new technique: there is the work in Australia, of Christine Perrott, showing the paradigmatic patterns of classroom dialogues. Generally, the pattern is what is known as IRE: the teacher initiates all dialogue in traditional classrooms, the student responds, and the teacher evaluates, 'mm', 'yes', 'no', or 'good try.' As Perrott points out, these patterns survive the rhetoric of so called "open questions" — a teacher can set the agenda to the open question. Such patterns of dialogue are inimical to critical and creative thinking, since the task set for the children is generally "Guess what's in the teacher's mind," and criticism and creativity actively discouraged.

Dialogue in the Philosophy for Children classroom has, in principle, an entirely different structure, in which student-student interactions are common, and in which the students take over the "teacher's questions" of "Why?" or "What reason do you have for saying that?" Perrott's re-

cent work on P4C classrooms finds that indeed, the turntaking and interaction patterns are quite unlike those in the traditional classroom.

It is tempting to hope for more from the analysis of dialogue than turntaking. The dialogue might serve as the basis of an enquiry into the very concepts of the critical and creative thinking we seek to inculcate. In the fashion of ethnomethodological studies, the concepts would emerge from the enquiry, rather than vice versa.

This is so far only a promissory note. Looking at segments of dialogues, we see that new ideas typically emerge under pressure of critical questioning. After analysing enough of these dialogues, generalisations about the patterns of critical discourse might emerge, and possibly even patterns in which creativity is encouraged. Each set of transcripts would have to be closely analysed in the light of its community of enquiry, but it may turn out that creative thinking in the group is a consequence of certain styles of critical thinking. Eventually, the dialogical styles characteristic of creative and critical thinking should be fleshed out so thoroughly that the concepts themselves would be clear. (If this sounds like back to dialectic, it is scarcely surprising).

The difficulty is that as a measure of the value of P4C, dialogues and commentaries are ponderous. We need, for pragmatic purposes, an equivalent of Gitlin's "recombinant talk," to streamline talk and provide sign posts for rapid recognition. We also need a well-motivated theory of analysis of discourse, so that the the structures of dialogue we discern are not *ad hoc*. For this purpose I hope to be able to apply Halliday style systemic theory to the analysis of transcripts. The strategy is to seek analysis of the rational structures of dialogues from P4C and control classroooms.

To give some sense of the direction of the analysis, I quote Robyn Triglone's work within this general framework on a difference between the P4C classroom and the control classroom at grade one level, discussing *Ping*. The control class, whose teacher is regarded as outstanding, goes in for brainstorming — there are a range of ideas which the teacher accepts and evaluates, but never develops. In Robyn's own class, trained in P4C, the children listen and respond to each others' ideas, and dissect "what follows." By a crude measure of creativity, such as that used in the Iowa tests, the first group is far more creative than the second. The first group produces

more ideas, but develops none of them. The task set by the teacher is to have an idea which she will approve. In the P4C classroom, on the other hand, the task is to develop ideas. Rather than brainstorming, the children think through new ideas critically, listen to each others' ideas and explore possibilities. They use a series of characteristic locutions, most obviously "If...then," but also many others.

I am in no position to say, yet, what a theory of critical and creative thinking in discourse will be. So far we can only sketch the directions we might take. The project of analysing critical and creative thinking through the analysis of discourse is one which can provide a suitable vehicle for the evaluation of P4C, since it goes to the heart of the objectives of the programme. As a byproduct, the dialogues themselves have excellent washback validity: if teachers can analyse the dialogue of their own classroom, they will be in a position to see why and how P4C teaches critical and creative reasoning skills through dialogue.

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