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# On collective unintelligence

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**Abstract.** The idea of collective unintelligence is examined in this paper to highlight some of the conceptual and practical problems faced in modeling groups. Examples drawn from international crises and economics provide illustrative problems of collective failures to act in intelligent ways, despite the inputs and efforts of many skilled and intelligent parties. Choices made of “appropriate” perceptions, analysis and evaluations are examined along with how these might be combined. A simple vector representation illustrates some of the issues and creative possibilities in multi-party actions. Revealed as manifest (un-)intelligence are the resolutions of various problems and potentials that arise in dealing with the “each and all” of a group (wherein items are necessarily non-parallel and of unequal valency). Such issues challenge those seeking to model collective intelligence, but much may be learned.

**Keywords:** intelligence, paradoxes, crisis, resolution, international economics

## 1 Introduction

Collective unintelligence is examined in this paper through considerations of illustrative problems and approaches from economics. The goals are to foster discussion of issues that appear to be important when intelligence is to be applied and to explore approaches with some apparent potential. The underlying position is that effective intelligence involves creative processes and dynamic balances which are inhibited by an overreliance upon formal or prescriptive methods.

Examples of collective unintelligence abound in our world with the ongoing global financial and economic crisis probably the most outstanding current example. Not only was this “event” unexpected by most, but importantly not all. Surprisingly little coherence is evident in recovery strategies. Worse still, the actions of many nations may well be escalating what has been a banking crisis into crises of national default and currency destruction. Two years into the acute phase of the crisis, collective processes have effectively generated a spread and deepening of problems, a commitment to risk, a potential for further failures and little real progress.

“Less unintelligence” in dealing with such problems is needed. Considerations from international economics (along with some from industrial economics and international business) are used to outline some core problems. Reflections offered draw from theoretical and applied analyses and well as observations on the educational experiences of tertiary students. Together these help sketch the nature of

“failure” in what de Bono [1] termed first stage (or more perceptual) thinking. Inappropriate choices (be they of specification, positions, information, influences, focii and frames) are all potential sources of errors, failures and “unintelligence”.

A central conceptual issue is the types of association and selection favoured in any multi-party situation. How this is then treated is particularly critical in second-stage (or more analytic) processes. An illustrative application using vector analysis and non-parallel items allows consideration of not just crises but also of the influences from prevailing methods. Intelligence is in part an exercise in avoidance of undue dominance. Brief consideration of the *aufheben* in Hegel’s dialectic shows how some favoured analytics can strongly flavour perceptions, actions, outputs and outcomes.

Notionally, applied intelligence is evident when projects and projections “work out satisfactorily”. While satisfaction may be “merely” in terms of survival, typically something “more” is sought. Enhancement of some or other attributes may be a goal of an intelligent agent or group. Changes in quantity and quality style development, and these may be variously evaluated, including by various group members. Successful collectives dynamically and creatively resolve differences, to the sufficient satisfaction of each and all. “Unintelligent” ones fail in one or more of these aspects.

Arguably, intelligence as manifest in skilful use of appropriate tools (including thoughts and contributory inputs) and effective achievement of desired outcomes is in short supply in significant areas of the economy. Examining “unintelligence issues” may help elucidate what needs to be done if collective gains are to be more readily achieved and distributed.

## 2 Formulating collective unintelligence

In contrast to collective intelligence which is actively researched as this conference and others attest, “collective unintelligence” is little discussed. Yet all manner of maladaptive or otherwise unintelligent behaviours are evident in economies and economics. Attendant crises abound. History is replete with booms followed by busts, of manias and panics, and of fallen mindsets and beliefs. The societal bases of crises and associated “unintelligence” provide a convenient focus.

People in an interdependent group can worsen situations by trying to do what is individually perceived to be “good” or “right”. Keynes [2] provided an example in the paradox of thrift: consumers can be *worse off by saving more* due to the aggregate or collective decrease in generated consumer demand and an associated greater fall in incomes as growth and investment ease. Thus, collective savings fall despite greater individual efforts to save.

Ideas may become debased, with the use of international trade theory providing an example. “All of the things that have been painfully learned through a couple of centuries of hard thinking about and careful study of the international economy have been swept out of public discourse” by pop internationalism [3]. Such issues are no longer historical or intellectual curiosities as crisis-hit nations search for better collective outcomes and some “desperately needed” solutions.

Analytic discussions are often couched in formal terms (and may address narrow or technical aspects or such things as logical fallacies of composition). It is striking how poorly such treatments travel beyond the immediate analysis and literature, or in the minds of students. Central points often seem to be lost in a fog of confusion and detail. “Why?” questions that can be suggested include:

- why a critical or crisis situation can or does occur in a collective setting?
- why the body of relevant analysis does not disseminate more fully? and
- why students and intelligent others struggle with explanations offered?

Relaying particular or common understandings involves projecting insights into event occurrences *via* information dissemination, idea comprehension and other steps. Evaluation of any such understanding may include considerations of such things as:

- the sensitivity to definitions adopted;
- the problems of resolving many intelligences or positions; and
- the issues of relevant emphasis.

Such “how” issues while often noted are typically then worked around by assumption.

Exploring these three “how” issues further shows some possibilities and problems.

1. **definitions.** Pfeifer and Scheier [4], for example, who comment that intelligence is “hard to define” and that “not much agreement has been achieved” (p 6) find a “common denominator” in adaptive behaviour which has “two components: complying with existing rules and generating new behavior” (pp 20-21). Other definitionals could be used, such as preserving some properties other than rules. However, unchanging behavior may be adaptive, including over some horizons but not others, and may involve explicit and appropriate choices. These comments are not meant to criticise good work but rather to point out the special and sometimes still-ambiguous nature of any definitional basis. Further, when or how might definitionally intelligent behavior be situationally unintelligent? What accords with definitions need not accord with some wider reality.
2. **one or many intelligences**, and, if the latter, how these should be reconciled. Such multiplicity can occur within one party *or* between many.
  - a. The multiple intelligences of the single human [5] have been variously expressed<sup>1</sup> but achieving effective balances appears under-considered. How might suitable balances be “objectively” or impersonally achieved, or are they inherently personalised?

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<sup>1</sup> As expressed by 6. Armstrong, T. *Multiple intelligences*. 2000 [cited; Available from: [http://www.thomasarmstrong.com/multiple\\_intelligences.htm](http://www.thomasarmstrong.com/multiple_intelligences.htm). the eight intelligences are: Linguistic intelligence (“word smart”); Logical-mathematical intelligence (“number/reasoning smart”); Spatial intelligence (“picture smart”); Bodily-Kinesthetic intelligence (“body smart”); Musical intelligence (“music smart”); Interpersonal intelligence (“people smart”); Intrapersonal intelligence (“self smart”); and Naturalist intelligence (“nature smart”).

- b. In any group of “intelligent” parties there will be a multitude of “intelligences” and any expectations of a single collective preference are bold, situationally and analytically. Cournot [7] was among the first to mathematically explore situations of economic interdependence wherein the outcomes for one (and for all) depend sensitively and in part on the actions of some other. His work and much of game theory demonstrate well many problems “of interdependence” which remain essentially unresolved today.
  - c. Ricardo [8] preferred the bold position, arguing for mutual gains from trade *via* comparative advantage for any nations. For some, intelligence became belief in a rule with the “can gain” of possibility became a dogmatic “must”, particularly under Empire. The limitations and setting of Ricardo’s work remain often ignored.
  - d. Olson [9] considered how tight minorities could drive collective positions, even if the majority was to be disadvantaged.
3. **approach choice, focus and relevance.** Arguments abound about excessive attention to some preferred aspect(s) or intelligence(s) of an individual or group.
- a. The recent popularization of the “emotional intelligence” argument [10] enlivened the debate but gains made remain uncertain. Interestingly “rationality” is the preferred touchstone in economics.
  - b. De Bono [11] sees potential in creative sequencing of different “hats”<sup>2</sup> which help direct focus and attention in thinking to achieve a more effective and constructive application of intelligences.
  - c. In terms of thinking about information (within the white hat, say) de Bono [12] proposes six complementary frames<sup>3</sup>. We may ponder potential insights from framing under the other coloured hats.

Related is the question of whether terms of intelligent or unintelligent add anything of value, and indeed what do the terms mean? “Intelligence” remains a highly contested term and its exercise involves some fluidity in action and interpretation.

“Unintelligence” could arise from adverse influences in any of these areas. Note all these aspects are *prior to* any detailed analysis. “Something somewhere in how things were approached does or did not work out” would be a forensic expectation when approaching an incident scene of potential or realized collective unintelligence.

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<sup>2</sup> The six hats (with focus) are: white (information); red (feelings, emotions and intuition); black (faults, weaknesses, risks); yellow (values, benefits and how to achieve); green (creative effort); and blue (organization of thinking). Arguably much discussion is white then black, a presentation of information with highlighting of weaknesses: in an informal experiment, advanced undergraduate students studying tourism were markedly reluctant to engage in hat thinking beyond the white and black. Some found the whole process most confronting.

<sup>3</sup> The six areas of attention (and frame) are: purpose (triangle); accuracy (circle); point of view (square); interest (heart); value (diamond); and outcome (slab).

A particular approach is now built from a working definition of “*intelligence*” as “*an ability to project successfully*”. While there may be an interpretative bias towards a focus on “*ability*”, *unintelligence* might involve some inability, failure(s) in and/or of projection and/or lack of success. To explore this working basis, chosen situations and specifications will be both analysed and suggestively constructed.

This definition of intelligence can be expounded in various ways, for example as:

*an ability* of \_\_\_\_ *to project* \_\_\_\_ some item *successfully* \_\_\_\_ on some grounds

*Success* is now set here in terms of goals with evaluation to be somehow by comparison with them. Such a phrase can be populated in a variety of ways. Illustrative examples could include *an ability of*

- an organism *to project* past a danger *so as to* survive or build a relationship
- a group of workers *to project* their efforts *so as to* produce and prosper
- a baby *collecting toys* in a basket *so as to* carry more of ‘mine’

Each of these could be deemed “economic” as they involve resource use. They could be alternately deemed as psychological (mind involving), physiological (involving use of a physical body), aspirational (as they may evidence purpose) and so on.

Each could be debated in terms of the nature or type of intelligence evident, and as to why any instance or example qualifies as an exemplar of intelligence at all. Does the organism, worker or baby have to be human, or organic – and if not, why? Such debates while important are beyond the scope of this paper. The approach here is to draw a little from centuries of economic investigations whereby “collective intelligence” was built *so as to* advance the interests of all and, variously, each. It was after all “the Wealth of Nations” that drew the attention of Adam Smith [13] and of many since. Much was learnt from failures, and to these we now turn.

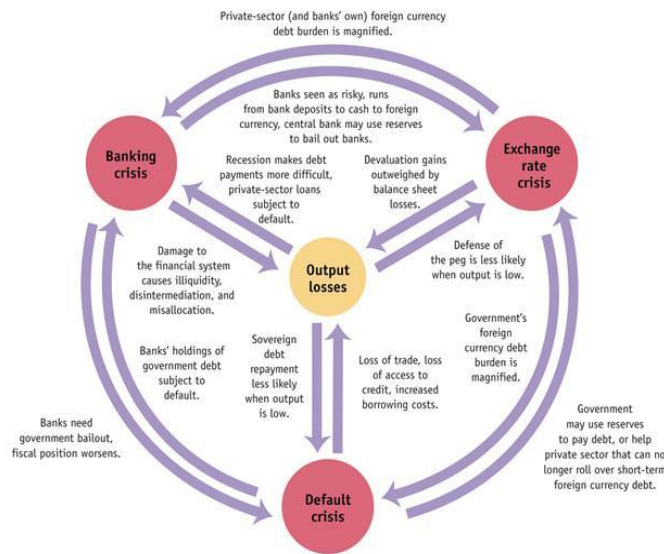
### 3 Just “stuff ups” or collective (economic) unintelligence?

Economic crises of various types occur reasonably regularly in nations and regions around the world. Marhnsen [14, p 533] lists fifteen developing nations associated with the 1980’s debt crisis. The US financial system with its Savings and Loans crisis was also restructured to accommodate unrepayable debts. As Feenstra and Taylor [15] detail, 1992 saw six European currencies depreciate up to 25 percent. The 1997 Asian exchange rate crises impacted eight nations heavily (peak falls in the baht and rupiah were 50 and 80 percent) with subsequent pursuit of strong external surplus positions (mirrored by high deficit positions in several developed nations such as the USA and Australia). Other notable currency crises include the Brazilian real (-40% in 1998), Russian ruble (-80% in 1999) and Argentine peso (-80% in 2002). De Paoili, Hoggarth et al. [16] list 45 crises between 1970 and 2000 involving default, of which those also involving exchange rate and banking crises numbered 21 with an average length of 10 years and a mean cost per year of 22 percent of GDP. Collective failures in economies are neither rare nor trivial.

“Every crisis is different, of course. Ukraine faced hyperinflation in 1994; Russia desperately needed help when its short-term-debt rollover scheme exploded in the summer of 1998; the Indonesian rupiah plunged in 1997, nearly levelling the corporate economy; that same year, South Korea’s 30-year economic miracle ground to a halt when foreign banks suddenly refused to extend new credit. But I must tell you, to IMF officials, all of these crises looked depressingly similar.” [17]

At base in a crisis is some unexpected event which sees expectations out of kilter with new realities. Johnson [17] sees the economic solution as “seldom very hard to work out” and focuses on the political and institutional issues which brought about the crisis and may stand in the path of an IMF style solution, a “solution” much debated. Actual transitions from crisis, such as those of the post-Soviet nations in Central and Eastern Europe, demonstrate both variously successful resolutions of crisis and that it is often difficult to effect “a solution”. Success is not assured, nor a path determined.

Several distinct types of crisis that can be variously interlinked are recognised in international economics. A convenient reference is the development [15, 16] which combines bank, exchange rate, default and industry crises in an interlinked group, as reproduced below.



**Fig. 1. Vicious Circles in Twin and Triple Crises** [15 Fig 22-23]

Single or successively building twin and triple crises are taken as impacting on real output (centred on product production and consumption), with further feedbacks possible from the real economy to the finance, monetary and government sectors.



The elements in the schema are these:

- Banks and a financial system, termed Finance, F say
- A set of currencies variously exchangeable, Monies M
- Governments, G, with their policies and influences “for the collective good”
- Product producers and consumers, as industries I

The whole, which might be termed “FIGM”, is a figment of their “informed” imaginations. FIGM relays a pattern<sup>4</sup>. It is an indeterminate complex of four distinct elements variously interrelating.<sup>5</sup> However, not only are these elements interlinked. Each element is itself complex having some internal structure and arrangements that condition conduct and may (or may not) allow for internal resolutions of problems. Any exercises in unintelligence that may lead to crisis can then be seen as potentially internal to some element, linked externally in some way to another somehow-like element, and/or interlinked generally with several or all other elements.

Facing the question “How is sense to be made of such confusion - or richness of possibilities?” we make assumptions, including of significant associations and of some sequencing via time or cumulative effect. That is, we build a model. A cadence of interactions or flows is imposed across the complex to produce some applicable order.<sup>6</sup> We then assume that a preferred cadence is relevant and somehow meaningful, or at least sometimes (or at some time) plausible.<sup>7</sup> Much debate centres on the superiority of this cadence or that, both technically and as deemed relevant.

It may surprise but the idea of “crisis” is little considered in “International Economics” texts.<sup>8</sup> It was interesting recently to find how effective introducing “crisis” at the beginning of semester and paralleling it with standard expositions of theory appeared to be in developing student understanding. This mirrors educational experiences in international business and industry analysis where reflections on the tensions between alternate perceptions aided learning. Each of these three areas has a distinctive yet complementary focus and position. Together they can provide richer insights into international and national business situations. Speculatively then, what complementary insights might advance collective intelligence?

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<sup>4</sup> Note that while the pattern is based around four elements there are omitted direct considerations, such as of balance of payments imbalances.

<sup>5</sup> Note that external (to the focal nation) linkages provided by currency, financing, trade and other flows from the rest of the world are not shown. Alternately, the schema may be taken to represent a global situation so the model may be assumed closed externally, but each item (node and flow) is then internally heterogeneous in marked and significant ways.

<sup>6</sup> This is essentially the line of development of Cournot and others who build from a sequence of propositions and inferences to suggest possible configurations and inferred conclusions.

<sup>7</sup> For example, currency crises since 1970 have been classed as four generations, with each reflecting a different configuration within Fig 1.

<sup>8</sup> Anecdotally, only one of eight advanced undergraduate texts scanned included explicit discussions of “crisis” or “currency crisis”

#### 4 A vector example

Following a short recap of vector basics, triple products are illustratively explored to demonstrate various generated outputs. There appears to be some potential to aid understanding of collective situations in economics and intelligence. The development is preliminary and suggestive so comments are very welcome.

A vector is geometrically a directed line. It can be specified by a length and direction or by a joining of two ordered points. Metaphorically, a base point can be seen as successively projected across space to a destination. Alternately, a directed line is bounded and positioned. Additional assumptions allow “the line” to be “moved across space” if suitable parallels are maintained.

Consider now three vectors **f**, **g** and **m**. Assume that they cross at some common point O. The vectors can be seen as the distinct projections from some common point O of collocated entities F, G, and M. Two types of vector products can be formed:

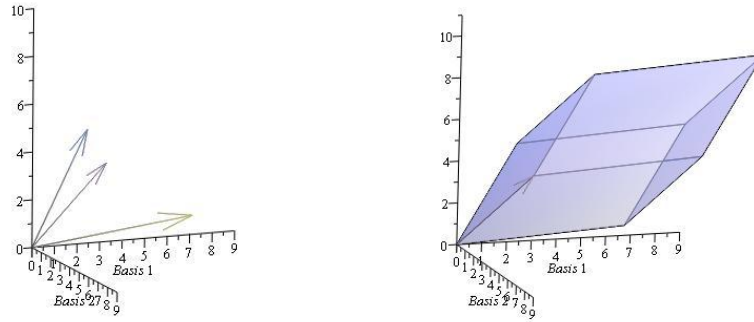
- **scalar** (also known as dot or inner, designated by “.”) **product**. One vector is projected on the other with a scalar (or non directed) output. A vector property disappears and a single, unpositioned number remains.
- **vector** (cross or outer, designated by “x”) **product**. One vector is combined with another with a non-coplanar vector output. The output is in a different dimension.

With three vectors, compound products are possible. The scalar triple product is of the form  $\mathbf{f} \cdot \mathbf{g} \times \mathbf{m}$  while the vector is of the form  $\mathbf{f} \times \mathbf{g} \times \mathbf{m}$ . The former has a single numerical or scalar output (equal to the volume of a parallelepiped built on the three vectors) while the latter has a vector output (in the plane of the two vectors first crossed). Both products synthesise three “distinct elements” into a single or a set of dimensionally different products. The scalar triple product is illustrated in Figure 2.<sup>9</sup> As an illustrative application, this product can be seen as an indicator of credit available at some time  $C_t$ . Credit is built on projections adopted by financial, governmental and monetary entities. F, G and M together project C.

The point in using vectors and their compound products here is that three separate entities taken “together” (specifically at the same point O) can produce (*via* product operations) a collective outcome which is infeasible if any one was absent or not “co-operative”. Not only does a vector project a point across space, three vectors can alternately project the value of a subtended volume and an output vector which is a linear combination of the first crossed pair (despite the generative presence of the third non-coplanar vector). In both cases, the output is dimensionally different to the basis set. The scalar triple product lacks any spatial dimension while the vector triple product lacks any unique dimensional attributes of the procedurally-third vector. These are intriguing outcomes for well-ordered associations of three elements.

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<sup>9</sup> Considerations of the vector triple product are left to another place.



**Fig. 2.** Scalar triple product with product value projected as a parallelepiped volume

The elements have distinctive contributions and are thus of value and necessary presence but they are not equi-valent. This unequal valency<sup>10</sup> is lost in the collective scalar outcome so some “exogenous” allocation or distribution schema will be needed. In economies this is often couched in custom or culture or concepts such as “a fair go”. The area may be one of societal accord or discord.

Speculatively, does a triple product qualify as an expression of intelligence?

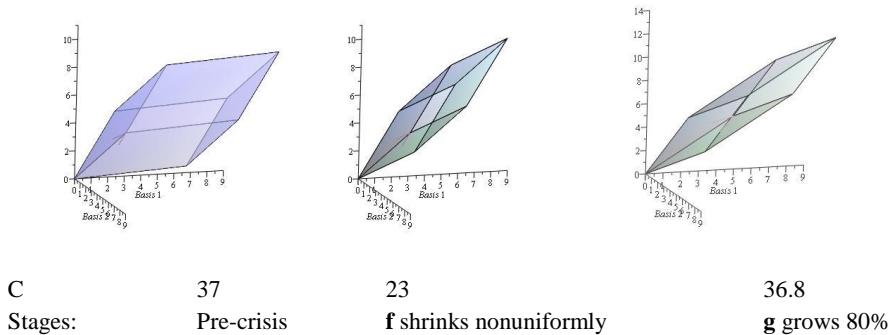
- Both definitional requirements of Pfeifer and Scheier appear met, superficially at least, if we accept dimensional change (which is a change in collective quality when the set is combined according to the rules) as a behavioural outcome.
- The suggested working definition is two-parts met but “successfully” needs elucidation. If, for example, the goals of the vectors or of those cojoining them included having a basis for a volume of a certain size, then the scalar triple product might indeed be adjudged not only “successful” but “intelligent”.

Vectors are, of course, assumed to be non-sentient entities yet a case could be built that there is *or may be* intelligence in their triple products. Alternately, perhaps it is not the vectors but the product processes that instills “intelligence”? Is it Nature (of the vectors) or Nurture (via the product environment) or both that yields the outcome adjudged as intelligent – or is the whole situation somehow misspecified? More broadly is there an inference of intelligence by the observer or is the product as an output of human thought an artefact with intelligence embedded. If a triple product is an invention of imagination, did the imagination embed or uncover intelligence? Such questions may lead in many and potentially constructive directions.

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<sup>10</sup> Literally, “strength” in some situation of combination. This is interpretable as differing ability to contribute or power of contribution. Note that there are both quantitative and qualitative components of strength.

Applying such considerations to issues of crisis, a “crisis event” can be seen as a situation when projections by parties based on their expectations are not realized in practice (ie, with the passing of time or influential events). The panel in Fig 3 illustrates an hypothetical credit crisis where expected credit  $C_1 = 37$  is reduced in an F “meltdown” to  $C_2 = 23$  followed by an increased projection by G to rebuild credit  $C_3 = 36.8$ , ie to near  $C_1$ . Government “projects 80% more” to offset the “75% lesser projection” by finance and the associated 38% drop in Credit available.<sup>11</sup> This illustrates the Keynesian liquidity trap and the governmental response which is ideally short term until the projection **f** of Finance F recovers. That is, credit on issue is maintained by changing the contributions of the elemental parties in offsetting ways.



**Fig. 3.** Initial situation, crisis and response: an illustration of “Credit” differently composed

The schema can also be applied to intelligence if the vectors reflected “assessed intelligence”.<sup>12</sup> Each of three parties (or three parts of one party) is set against the three dimensions of some definitional basis, such as those earlier mentioned. For some reason the scalar value of **f** is assessed “downwards”, perhaps as a result of some noted unintelligence and/or “meltdown”. Within-group compensation is through a greater reliance on **g** to maintain the value of the collective product, a reliance that could lead to further crises (Figure 1).

It is an open question whether the collective credit or intelligence C is sustainable or apposite to the situation faced, or whether a fresh start should be made. So far, a “same-as-was-usual” ploy has been the favoured response for both the collective credit and unintelligence problems of the global financial crisis. However, history indicates a marked and lasting reduction in credits and debits along with insolvencies at some stage in any true recovery, a repositioning of ideas and attitudes and new judgments of “creditworthiness” and “intelligence”.

<sup>11</sup> Monetary parties M are assumed to remain unchanged for ease of exposition. Note also that government G is assumed to act directly without involving finance F. To the extent that G borrows via F, **g** as projected (but not as obligated) will be reduced and **f** increased

<sup>12</sup> presuming some suitable basis, means of measurement and units of measure.

## 5 Conclusion

The approach of Hegel is commonly cast in terms such as “Thesis, Antithesis and Synthesis”. Some identified “thing”<sup>13</sup> is associated with a different one resulting in some new thing. Often the preference is to choose “the competing opposite” as the antithesis but the method is wider. One or more “complementary differentials” may be used as in the vector example. The process whereby synthesis is achieved is *aufheben*,<sup>14</sup> a term little used or, arguably, understood in English.

Two examples illustrate something of the many usages, and some of the potential problems if “unintelligence” were to be used simply as a competitive antithesis:

- The arguments of Marx and others cast a thesis (Labour, a projection of direct human effort) and antithesis (Kapital, an alternate projection) in competitive opposition, despite their mutual interdependence in production, consumption and societies. The posited struggle between them has coloured much history, and for the revolutionary *aufheben* became a process of achieving dominance given competing interests or theses.
- Bernanke demonstrates an allegiance to a thesis of rationality (preferencing a particular projection of analytical thinking) and a discounting of “irrationality” (including of such things as opportunism). He and other current (but not some past) central bankers profess an ongoing commitment to monetary rules to change behavior, “intelligent” behavior in the sense of Pfeifer and Scheier. Whether such commitments are sufficient to the tasks at hand or a source of collective unintelligence is a point of current debate.

Whatever the merits of chosen ideas, practical implementations can demonstrate much collective unintelligence. Interpretation of influences as competing opposites is but one interpretation, one of arguments in an idiomatically two-vector scalar product tradition. Using triple products could enrich our dialogues and representations.

- Production could become the product of land, labour and capital variously combined “co-operatively” to yield scalar and vector product outcomes.
- Central bankers might consider various outcomes of rationality, opportunism and unintelligence (be this in institutional, consumer or institutional stances).
- Using FIGM and like projections, an improved representation of “Credit” or perhaps “Intelligence” and their various interplays may be developed.
- The combinations of Hegel’s elements can be cast in a new light.

Triple products can provide rich second stage representations. Whether these are meaningful and usable is the related first stage issue. Both warrant attention.

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<sup>13</sup> such as an entity, attribute, position or projection, for example.

<sup>14</sup> *Aufheben* is a rich word with a range of interpretations. Briefly, it contains the idea of building up while breaking down (as in Schumpeter’s “creative destruction”), the idea of maintaining some things while changing others (as evident in the “diversity-compliance tradeoff” casting of intelligence by Pfeifer and Scheier), and the idea of opposition and differences to be resolved. The concept deserves renewed attention.

Efforts to understand collective intelligence are important as are those to avoid or mitigate crises. It is hoped that ideas in this paper illustrate how areas might be advanced not only technically but in ways meaningful to our lives and societies. Clearly much remains to be done. Cooperation and mutual regard in dialogues and developments are needed if the area of collective intelligence is to become potent and enabling. Collective unintelligence and alternative models of association indicate ways to better appreciate crises in economics and how humans with their artefacts “intelligently” position and project themselves to achieve and advance, or otherwise.

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