Reason for Paraconsistence

(Rough Draft)
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For thousands of years, consistency has been the criterion of rigorous and accurate reasoning across the Western world, even if it hasn't always been consistently applied. In order to address this important controversy, I would like to make an argument against both strong consistency and strong inconsistency in systems of reasoning. I propose paraconsistent systems of reasoning as supplemental alternatives to consistent systems of reasoning.

Strong consistency is the tendency of a person or a system to satisfy the conditions of an argument absolutely without contradiction and for a person or system to be able to interpret a theory such that all the formulas in the theory are true. Strong inconsistency is the tendency of a person or a system to satisfy the conditions of an argument only with contradiction. We call those who fail to be consistent hypocritical.

[Summary of paraconsistency, IE weak consistency/inconsistency. Meaning of the word “paraconsistent” Besides non-contradictory.]

The basis of consistency is a dual pair of axioms, non-contradiction: ∄*(p and ¬p) “There does not exist some proposition that is p and not p”* and excluded middle ∃*(p or not p) “There exists some proposition that is p or not p”*, as well as at least one structural rule such as weakening (the copying of propositions, represents the property of monotonicity of entailment) or contraction (the erasure of propositions, represents the property of idempotency of entailment). The combination of these constraints create a process called explosion which entails the consequence that if a contradiction is present in the premises of an argument then the consequence of the argument will explode to triviality, entailing that any consequence is paradoxically true and false at the same time. The non-contradiction constraint demands that this is not the case, so we reasonably conclude that explosions can not and do not occur within our system of reason; therefore, we arrive at proof by contradiction from explosive consequences: contradictions are sufficient for explosive consequences and contradictions do not exist by axiom.
“In logic, a **consistent** theory is one that does not contain a contradiction.[1] The lack of contradiction can be defined in either semantic or syntactic terms. The semantic definition states that a theory is consistent if and only if it has a model, i.e. there exists an interpretation under which all formulas in the theory are true. This is the sense used in traditional Aristotelian logic,

although in contemporary mathematical logic the term **satisfiable** is used instead. The syntactic definition states that a theory is consistent if and only if there is no formula *P* such that both *P* and its negation are provable from the axioms of the theory under its associated deductive system." [Wikipedia]

The basis of strong inconsistency is simply accepting anything as reasonable. If we affirm the process of explosion and the existence of strong contradiction in the system, everything we could think to utter or do, or otherwise express would be trivially true and false even those things which do not agree with observation; thus, they explain nothing. Strongly inconsistent systems of reasoning are not generally considered by mainstream Science, Technology, Engineering, and Mathematical--STEM--communities; in fact, the communities explicitly reject strong inconsistency by consensus, so we will mainly concern ourselves with arguments against strong consistency and leave the concerns of strong inconsistency with the only major demographic that actually considers it valid: fundamentalist religions.

[Intro argument for paraconsistency followed by a statement of motivation for arguing against strong consistency and in favor of paraconsistency.]
If properties are present in the spectrum of paraconsistent arguments which are lacking in the black and white universe of consistent arguments, we are presented with a marginal argument existing at the fringe of mainstream consensus, the acceptance of which would herald the most radical change to science, logic, and reason since the birth and maturation of the formal deductive and scientific methods, of the hypothetico-deductive method; it would seem to be a minimum of effort for a maximum of difference.

Currently, our theories and methods arise as objects of our systems of reasoning. What we can reason about in theory is limited in principle by the constraints of our systems of reasoning. If our systems of reason are unreasonably constrained, we will fail to explicitly reason about observable phenomena. The two cases I use to argue for the abandonment of strong consistency, other than simple inquiry and exploration of alternatives, are the Physical and the Social arguments.

"If these semantic and syntactic definitions [of consistency] are equivalent for a particular logic, the logic is **complete**." ""In logic, semantic completeness is the converse of soundness for formal systems." "A formal system $\mathbb{S}$ is **syntactically complete** or **deductively complete** or **maximally complete** or simply **complete** if and only if for each formula φ of the language of the system either φ or ¬φ is a theorem of $\mathbb{S}$. This is also called **negation completeness**. In another sense, a formal system is **syntactically complete** if and only if no unprovable axiom can be added to it as an axiom without introducing an inconsistency." [Wikipedia]

"In mathematical logic, a logical system has the **soundness** property if and only if its inference rules prove only formulas that are valid with respect to its semantics."[Wikipedia]

The Physical argument arises from interpreting a material body as a physical proposition and its state values as the truth-values of the assertion on that proposition. We take the principle of non-contradiction as a hypothetical with the prediction that the particle will either be in state p or not in state p but will not be in state p and not in state p at the same time. We can show then that quantum mechanically the particle violates strong consistency by entanglement and superposition. It will occupy both a state and the state's negation at the same time with varying degrees. (This argument I attribute to Paola Zizzi)

The Social argument is simpler to state informally: people lie. They behave in ways which are inconsistent and contradictory; according to the philosophy of science the scientific method has to account for all observable phenomena. It is not good enough to simply observe the behavior and describe it, but we must also be able to reason about it and from it; no experiment having a form of the Liar's Sentence as its object can be consistently and conclusively evaluated. People exhibit mixed states of existence in which they are in state p and not p to conjugated degrees, hot and cold, please and displeased. In short, people are walking, talking instances of the Liar's Paradox in a logically sense. The system itself is aware of the limitations of its methods. It seems to be unconscious of the prevalence of its limitations in the observable world.

If one accepts that no strongly consistent system can completely model a person due to the Liar's Paradox and Gödel's Theorem, this conclusion would not forbid a paraconsistent system from in some sense completely modeling a person and would not imply that paraconsistent systems succumb to the Liar's Paradox.

As Zizzi argues, structurally consistent logical frameworks are too strong, and can not explicitly represent an entanglement operator in a sequent calculus. The operator with the appropriate properties can only be defined in a system that lacks non-contradiction and its dual, excluded middle as well as the structural rules of weakening and contraction. When the constraints of non-contradiction and one of either weakening or contraction are present, the logical connective collapses into a traditional Aristotelian logical connective; only the extreme cases of non-contradictory arguments are considered. Between those extremes, we find a middle way in spectra of paraconsistent arguments.

"Choice" gets caught between the extremes of consistent decisions. A paraconsistent general recursion function is what one could identify as a Choice. Whereas deterministic systems can be completely described by first order consistent logic systems, formal decisions are what one would use as the model for consistency. Upon reaching the quantity of Uncountable Arguments, one hits the halting problem for non-finite decisions. Observation can be seen as a kind of logical cut which slices true from false, rendering p and not p into p or not p - Choice determines whether or not the cat is in or out of the box, but only at the moment of Actuality in the space of infinite Potentialities.

If the universe we live in is the result of information coalescing into finite pure and mixed states, the requirement of strong consistency is too strong a constraint; Turing computability is too

narrowly constrained to describe all physical phenomena - of which consciousness is an integral part. If we exist in bubbles of actuality in a vast space of potentialities, the result is a deus ex machina argument from a paraconsistent computable universe perspective. The aim of this argument is to widen the logic and methods to make utilization of theories of physics and computing viable, in order to approach a description of paraconsistent completeness.

Glossary

Strong Consistency
Weak Consistency
Strong Inconsistency
Weak Inconsistency
Paraconsistency
Completeness
Contradiction
Abduction
Deduction
Induction
Inference
Implication
Entailment
Decision
Choice