FROM BASIC LOGIC TO A QUANTUM LOGICAL APPROACH TO MATTE BLANCO'S BI-LOGIC

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We consider a model in first order logic developed for quantum mechanics. It consists in formalizing assertions from the axiomatization of Quantum Mechanics [Ba], adopting suitable equations to define connectives, as in basic logic (reflection principle) [SBF, MS].
In the model first order domains are characterized as "infinite" when they correspond to pure states (prior to measurement) and "finite" when they correspond to mixed states after measurement.
Such a characterization is extended to singletons as well. So one defines "infinite singletons", corresponding to pure states with respect to observables incompatible with the measured observable. This means that no closed term is available in the language in order to describe them.
Infinite singletons are characterized intensionally, requiring that the universal and existential quantification coincide on them. In basic logic, this can be interpreted as the definition of a "symmetric" quantifier and eliminates negation (in the spin model of quantum mechanics, infinite singletons correspond to the eigenvalues of negation).

We need to recall that the coexistence of closed and open terms was already pointed out by Freud in his monograph about aphasia: by explicitly referring to J. Stuart Mill's Logik, he distinguished on this ground the so called 'word-representation' (Wortvorstellung, i.e. the closed term) and 'thing-representation' (Objektvorstellung or Sachvorstellung. i.e. the open term) [Fr].

We see that, in logic, considering infinite singletons gives a "symmetric" environment, corresponding to the "symmetric mode" that, following Matte Blanco, characterizes the primary process described by Freud [MB]. We furtherly discuss how Matte Blanco's "bivalent mode", that is the other mode of his Bi-logic, is derived from the collapse of the symmetric mode, which is characterized as "infinite" in Matte Blanco, to the finite.

Modal logic represents an important additional tool for the further development of the model. A modality can be introduced in the quantum model itself [Ba2], in order to define "the objective property of the particle with respect to every direction of the spin". This is not in contrast with the no-go given by the Kochen-Specker theorem of Quantum Mechanics, since the spin model is bivalent. The result is S4, characterized by Kurt Goedel as the modality which recovers the infinitary content of proofs.

In foundations, our approach would allow to discuss the role of a pre-existing symmetric infinite

with respect to the mathematical infinite.
In psychoanalysis, we are interested in exploring a possible interpretation of the formal introduction of the modal system S4 in relation to two theoretical points: first, the shift from the First to the Second Topic description in Freudian Psychoanalysis, and second, the consideration of transitional dynamics and the role of external reality in the Object Relations approach.

The model can furtherly explain other logical features of the human thinking, observed in psychology, beyond psychoanalysis, for example Beck's cognitive distortions [Sm].

Finally, we stress that, in the last times, the need for a formalization of MatteBlanco's theory has more and more emerged. We quote [LG, IKM] where a topological approach to bi-logic via ultra metric spaces is discussed.

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