Comment on „An Introduction to QBism with an Application to the Locality of Quantum Mechanics" arXiv: 1311.5253v1

Jiří Souček

Charles University in Prague, Faculty of Philosophy

U Kríže 8, Prague 5, 158 00, Czech Republic

jiri.soucek@ff.cuni.cz

In [1], it is stated that

Therefore when any agent uses quantum mechanics to calculate "[cor]relations between the manifold aspects of [her] experience", those experiences cannot be space-like separated. Quantum correlations, by their very nature, refer only to time-like separated events: the acquisition of experiences by any single agent. Quantum mechanics, in the QBist interpretation, cannot assign correlations, spooky or otherwise, to space-like separated events, since they cannot be experienced by any single agent. Quantum mechanics is thus explicitly local in the QBist interpretation. [1, p.4]

and

Among those absurdities is "quantum non-locality". We have been told that QBism is "too great a price to pay" to restore locality to physics. [1, p.10].

But it is not necessary to pay this price. The locality of Quantum Mechanics (QM) can be acquired with the much lower price. It is sufficient to consider the modified QM introduced in [2], which is local (at least in the sense specified below).

The modified QM is based on the principle of anti-superposition: no non-trivial superposition of individual states is a possible individual state [2].

The price to be paid for the restoration of locality is thus the abandonment of the principle of superposition (for individual systems – for states of ensembles the principle of superposition remains true in the modified QM).

The locality of the modified QM is expressed by the following properties of the modified QM

 (i) there exists a local explanation of the EPR correlations

 (ii) Bell inequalities cannot be derived in the modified QM (since so-called EPR reality criterion is not true in the modified QM)

Moreover, the modified QM offers certain benefits, e.g. the complete solution of the "measurement problem" [see 2, sect. 3].
References:

[1] arXiv: 1311.5253v1

[2] http://www.nusl.cz/ntk/nusl-177617
    (Czech national archive for grey literature)