Reviewer's report

Title: Improving cognition in schizophrenia: explicit or implicit training? A review.

Version: 1 Date: 5 September 2013

Reviewer: Alice Saperstein

Reviewer's report:

Major Compulsory Revisions

The question posed by the authors is to analyze whether implicit or explicit training paradigms are more widely used in cognitive remediation, and which yields greater improvements in neurocognition and social cognition. The authors reviewed 75 publications addressing remediation techniques, and categorized studies as utilizing one technique or both. Investigating the efficacy of implicit or explicit learning paradigms is a worthwhile effort given mixed evidence for impairments in each, as well as the need to delineate the most effective remediation techniques. However there are several concerns that lessen the scientific value of this paper.

1. Comparing the efficacy of implicit vs explicit vs combined approaches is confounded by a multitude of variables such as: the context in which remediation was conducted (e.g. in isolation versus integrated with rehabilitation), the treatment goal (e.g. to restore neurocognitive skills versus develop compensatory strategies to circumvent deficits), the outcome measures used to quantify treatment efficacy (e.g. improved performance on the training task vs an independent neurocognitive battery vs functional capacity or competence). Furthermore, the efficacy of different cognitive remediation paradigms have already been investigated in meta-analytic studies using statistical methods that allow for researchers to account for such variables. The authors here quantify the number of positive and negative outcomes from the studies included but are not able to adequately answer the question posed – which paradigm yields greater improvements in neurocognition or social cognition.

2. Remediation strategies have been otherwise categorized as drill and practice, strategy-based, or hybrid/combined approaches. This bears resemblance to the method of categorization used here (implicit, explicit, or both respectively) but has already been rigorously examined in meta-analyses (e.g. Wykes et al 2011). Thus it is uncertain to what extent this paper adds to our understanding of how different remediation paradigms compare.

3. The authors may be more effective in describing how implicit and explicit learning techniques are utilized in existing remediation programs, more in line with the authors’ first stated goal. To truly compare the magnitude of effects would require statistical analyses of existing studies or a dismantling study. If the purpose is to be descriptive, the authors might better clarify the roles of implicit or explicit learning when the paradigm is restorative (CRT, NEAR) or provides compensatory training (CAT), whether the target is cognition or functional
outcome, and whether the intervention is used in isolation or as a part of a larger rehabilitation program.

4. The authors’ designation of particular interventions as implicit/explicit is likely to arouse debate. For example, in the NEAR paradigm, drill and practice is utilized, which may be regarded as implicit learning, but strategy coaching and metacognitive exercises are used to supplement so as to facilitate generalization. Thus the authors’ designation of references #31 and #34 as exclusively explicit, for example, is of concern. Authors should revisit their classification of implicit/explicit but also check whether targets were misclassified as neuro vs social cognition. For example, Reference #82 refers to Training of Affect Recognition which targets an element of social cognition, but is included in Table 1 (Neurocognitive Deficits). A descriptive paper of implicit/explicit learning techniques might circumvent difficulties in classifying whole remediation paradigms.

Minor Essential Revisions

1. Introduction, final paragraph, “With these contrasting results, it is difficult to identify the best way to training cognitive functions…” – change training to train.

2. Materials and Methods, first sentence, use of the word “retrain” is misleading since the study includes both restorative and compensatory training paradigms. “Improve” would be a better option.

3. Results, section 3.2 – please spell out REF before abbreviating.

4. Discussion, 5th paragraph, reference #52 refers to the McGurk meta-analysis, and does not appear to be what the authors are actually referring to (rather McGurk, Mueser, de Rosa et al., 2009?)

Discretionary Revisions

1. In the final paragraph, the authors suggest that more attention is paid to the effects of cognitive remediation on “real-life” situations. The authors should consider that functional outcomes are often discussed and measured with respect to functional capacity given the limitations on affecting change in functional attainment within the time period of study. There have been papers written on exactly this topic, eg. Medalia and Saperstein, 2013 “Does cognitive remediation for schizophrenia improve functional outcomes?”. Perhaps clarification is needed on what the authors are suggesting?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:

I declare that I have no competing interests.