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The role of bilateral stimulation in resource development and installation

- A multi-channel near-infrared spectroscopy study -

[Background]

EMDR involves a unique procedure in which a patient is stimulated by alternating bilateral stimulation (BLS) while recalling a memory. BLS can be presented in three ways: by tactile stimulation, bilateral sound stimulation, and eye movement.

EMDR treatment employs two strategies: desensitisation and resource development and installation (RDI). However, the neural mechanisms and role of BLS in RDI remain unknown. In our previous study, RDI was conducted on 15 healthy subjects using tactile stimulation, and changes in blood flow during recall of pleasant memory with or without tactile BLS were measured. On questionnaires following RDI with and without BLS, participants who experienced RDI with BLS were more likely to report “increased accessibility” and “becoming relaxed” than were those without BLS. A significant increase in oxygenated haemoglobin concentration ([oxy-Hb]) in the right superior temporal sulcus (STS) and a decrease in the bilateral prefrontal cortex (PFC) were observed with BLS (T. Amano, M. Toichi, 2016).

In the present study we used the same protocol, but employed sound stimulation and eye movement as BLS.

[Methods]

RDI was conducted on 20 healthy participants using bilateral sound stimulation and eye movement.

The Profile of Mood States (POMS) was administered before and after the experimental session to assess the effects of RDI. Because RDI normally induces positive feelings, the purpose of this study was to determine whether the RDI sessions were successful.

In this study, RDI with and without BLS were compared two ways. To evaluate the subjective effects, participants' feelings were assessed using a questionnaire. Participants were asked, “How did you feel with (without) bilateral sound stimulation (eye movement)?” To evaluate the objective effects, physiological indicators were

assessed. Participants' [oxy-Hb] was measured from the PFC to the temporal cortex using multi-channel near-infrared spectroscopy (NIRS) during recall of pleasant memories with (without) BLS.

[Result]

There were no significant differences between participants' responses to RDI with and those without BLS.

Regarding the subjective data on feelings, most subjects answered that RDI without BLS was better than that with BLS; however, some gave the opposite answer. On the follow-up questionnaire, those with BLS answered, "BLS was useful for recall," and, "I became relaxed." The objective NIRS data revealed that, among the participants who preferred RDI without BLS, the [oxy-Hb] showed no increase in any brain area. However, among those who preferred RDI with BLS, the [oxy-Hb] increased remarkably in the right superior temporal sulcus (STS).

[Conclusions]

Activation by BLS in the right STS in some participants suggests that BLS may increase the likelihood that RDI will evoke more representational pleasant memories. Considering the neuroscientific evidence, it appears that the effect of BLS in RDI varies among individuals.

We suggest that therapists consider which kinds of BLS would be suitable for their clients and how best to use BLS in RDI.

Key words: resource development and installation (RDI), bilateral sound stimulation, eye movement, near-infrared spectroscopy (NIRS), superior temporal sulcus (STS),