



Letter to the Editor

Points that need attention in auditory N100 gating research in schizophrenia



With great interest, we read the article by Dr. Rosburg, reporting a meta-analysis of the auditory N100 gating studies in schizophrenia patients (Rosburg, 2018). Nevertheless, regarding the conclusion that “Findings are difficult to reconcile with the concept of a N100 gating deficit”, we would like to highlight three points, which complement his comments on potential moderators and study limitations.

The first point is the issue of filter settings. P50 and N100 are two auditory evoked potential (AEP) components that are widely used to assess sensory gating and associated cognitive functions in schizophrenia (Boutros et al., 2004). In addition to the role of 10 Hz high-pass filters in differential data filtering, it should be noted that the filter settings of 29 studies reported in Table 2/3 were diverse. For example, the two studies with large numbers of subjects utilized quite different filter settings (1–50 Hz vs. 0.5–20 Hz) (Turetsky et al., 2008; Neuhaus et al., 2014). Methodological issues regarding P50 filtering parameters have been mentioned (Freedman et al., 1998; de Wilde et al., 2007) and should be noticed in future auditory N100 gating studies likewise.

A second issue is the lack of discussion of the S1–S2 difference as a sensory gating measure. Despite Dr. Rosburg’s points that “the gating ratio and alternatively used S1–S2 difference are less reliable measures than the individual amplitude measures”, P50 gating ratio (S2/S1) has been accepted as an endophenotype for schizophrenia, as Freedman proposed that “the change in amplitude does not affect the differences in P50 ratio” (Freedman et al., 1998). Furthermore, de Wilde et al. advocated that “all P50 outcome measures including S1 and the difference between S1–S2 should be reported and considered as a possible endophenotype” in their recommendations for future P50 research (de Wilde et al., 2007). In N100 gating, in fact, there were group disparities of S1–S2 difference but not ratio (S2/S1) (Boutros, 2008; Boutros et al., 2004; Brockhaus-Dumke et al., 2008; Hsieh et al., 2012). Although S1–S2 difference was not included in the study design of this systematic meta-analysis, we strongly suggest that all gating measures (including S1–S2 difference) should be reported in future N100 gating studies, with higher ratio or smaller difference score reflecting weaker gating.

The third issue is the impact of low S1 amplitude in calculating the S2/S1 gating ratio. For example, for the P50, truncation from 0 to 2 and exclusion of subjects with S1 amplitude of less than 0.5 μ V were widely utilized across different P50 studies to avoid distortion (Boutros, 2008; Boutros et al., 2004; Brockhaus-Dumke et al., 2008; Hsieh et al., 2012). It is highly advised that, in N100 studies, consensus from clinical neurophysiology experts should be established.

In conclusion, we appreciate Dr. Rosburg’s efforts in evaluating this difficult body of literature. In addition to auditory P50 gating, auditory N100 gating is a promising area and deserves more focus. We do believe vitalizing the N100 psychophysiology research will provide gain on our knowledge of sensory gating abnormality.

Conflict of interest statement

None of the authors have potential conflicts of interest to be disclosed.

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