

So how do you feel about this?

An ERP study on opinion poll comprehension

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What happens in the brain when people have strong feelings about the text they read?

- ✓ Neurocognitive research on text comprehension typically uses texts that people don't really care about.
- ✓ Neurocognitive research on attitudes and emotions typically uses single words presented as primes or targets in a list.

Therefore, very little is known about how the brain supports the comprehension of natural text touching upon the reader's value system.

We recorded EEG as people of radically different political orientation filled out a realistic opinion poll on societal matters.

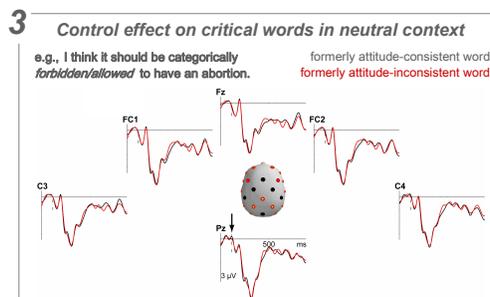
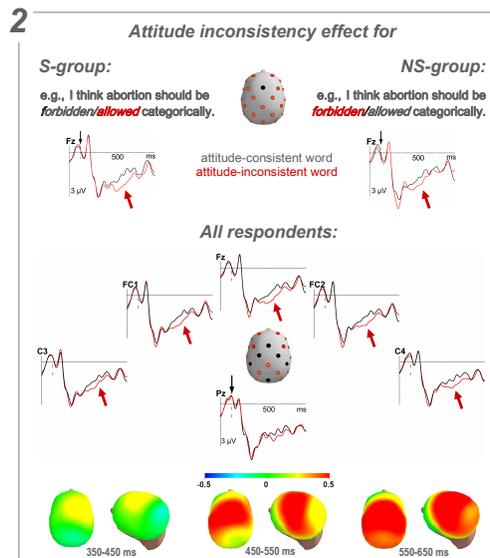
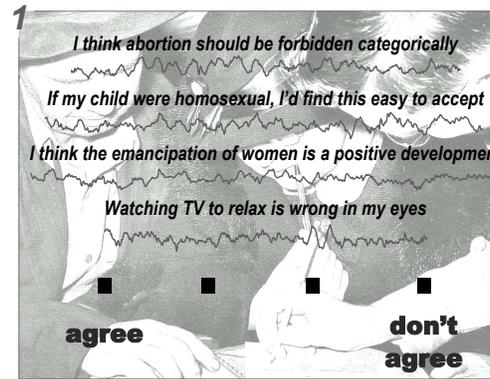
The critical statements (see panel 1) had been designed to be compatible or incompatible with average societal attitudes of members of a small Dutch Christian party (so-called *S-group* members).

In the ERP experiment, we presented these statements word by word to *S-group* members as well as to people with on average very opposing attitudes (*NS-group* members), and we asked them to indicate their agreement on a four-point "agree" – "don't agree" scale.

Our interest was in the brain's response to attitude-inconsistent critical words relative to the attitude-consistent control words, as people were reading each statement before responding. Because of the latter, critical words were never at the end of a statement.

Possible outcomes

- ? **No immediate ERP effect at the critical word.** A standard assumption in cognitive survey research [1] is that respondents in opinion polls do a linguistic analysis of the *entire* statement before they bring their attitudes to bear on the issue.
- ? **N400 effect.** If respondents identify with an unfolding statement like "I think abortion should be..." and can immediately bring their attitudes to bear on processing, the attitude-inconsistent critical word might be unexpected and/or more difficult to integrate into a representation of the sentence, leading to a standard N400 effect.
- ? **Late Positive Potential** In ERP research with value-laden words [2], a word that is incompatible with an induced attitudinal context, as in Hitler - Stalin - *Ghandi* - Mao, elicits a positivity around 400-900 ms. The LPP is also bigger for negative items relative to positive ones [3]



Results

- ✓ **Attitude-inconsistent words elicited a broadly distributed positivity between 400-700 ms in ERPs, visible in both groups of respondents (panel 2).**
- ✓ When the same critical words were preceded by a value-neutral sentence context, no such differential effect emerged (panel 3).

Note that there is a "hole" in the scalp distribution of the observed positivity (see bottom of panel 2). Preliminary analysis suggests that this might be caused by a very small overlapping N400 effect, particularly in ERPs for the *S-group*.

Implications

- ✓ In contrast to a common assumption in survey research, opinion poll statements *incrementally* unlock the relevant attitudes, with each word coming in.
- ✓ Because the ERP effect is not a clear standard N400 effect, attitudinal context does not constrain comprehension in the same way as other types of context, e.g., a story [4,5] or a speaker [6]. do.
- ✓ Our ERP effect resembles the LPP effects reported in word-level attitude studies [2,3]. If this equivalence can be substantiated in further research, it generalizes and extends the earlier word-level attitude-related ERP research to a 'real arena of language use'.

In all, our brain imaging findings show that opinion poll statements incrementally unlock the relevant attitudes, and that the neural processing of attitude-inconsistent words goes beyond what usually happens when words collide with the 'cold' interpretive context (as indexed by N400 effects). Our work also demonstrates that there is no reason to refrain from neuro-imaging the comprehension of language in situations where language matters.

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