

A pocket guide to conferences



Purpose of a conference

**cool new
science + networking**

poster vs. session

Robust and Explorative Analysis of EEG

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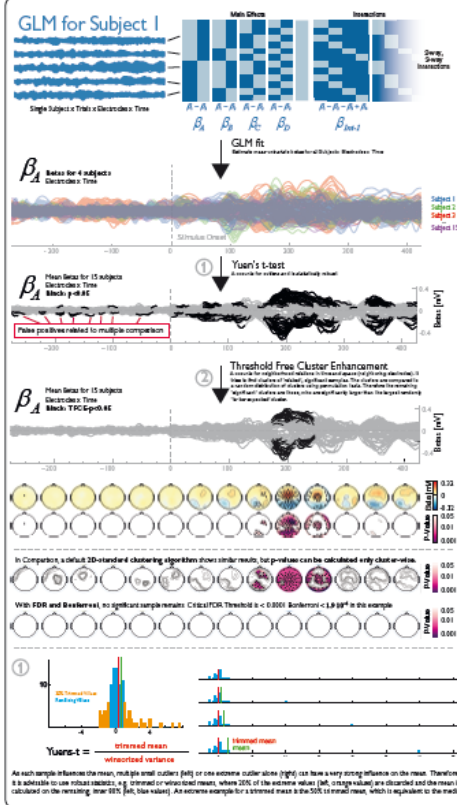
² Department of Neurophysiology and Pathophysiology, University Medical Center Hamburg-Eppendorf



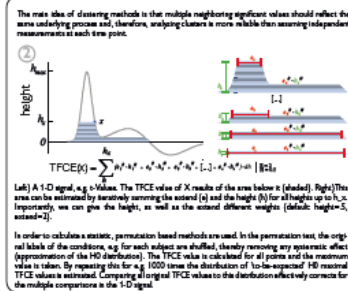
Background

Explorative data-driven analysis of EEG is burdened with problems related to the multiple comparison problem. In a standard EEG experiment testing a large number of electrodes and time points for potential effects is associated with a highly elevated familywise error rate (Type I). Furthermore, correction procedures that do not take into account the highly correlated structure of the data result in increased Type II errors. In addition, high inter-subject variability leads to outliers that possibly show the data and results in unreliable effects. In order to overcome these problems, we fitted mixed-effects models (GLMs) on single subject data and in a second step estimated effects based on beta-weights over subjects for all time points and electrodes (Pernet, 2011). In our experiment, we study the role of prediction of visual information during eye movement behavior. We displayed peripheral stimuli and, after a delay, instructed the subjects to perform saccades onto the stimulus. During this second, we exchanged the stimulus with a modified version in some of the trials. We analyzed pre- and post-saccadic ERPs in a 4x2 unbalanced factorial design. The EEG data (64 Channels, 500Hz) were corrected for multiple comparisons using the threshold-free cluster enhancement (TFCE) method. This method, instead of correcting each sample individually, makes use of cluster-based statistics. To account for outliers, we used Yuen's t-test and bootstrapped percentile methods of trimmed means as robust statistical methods for group-level comparisons. We present this fluid analysis driven by exemplary results of a main effect of changing the stimuli that closely resembles a P300 and interactions modulating this main effect.

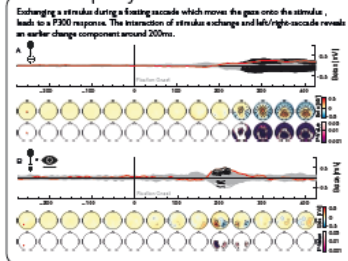
Methods



TFCE



Exemplary Results



Discussion

Analyzing EEG data using GLMs and TFCE allows for data-driven explorative analyses. The robust statistics and the Threshold-Free Cluster-Enhancement result in more unbiased results. In comparison to 2D-default-clustering, TFCE allows for a correction on every data-point and thus can be more sensitive and fine structured. False Bonferroni or FDR correction often results in an overcorrection and thus loss of power.

References

Cybil R. Pernet, Nicolas Chauveau, Carl Geiger, and Guillaume A. Rousselet, "LMO-EEG: A Battery for Identifying Linear Mixture of Latent-Independent Data", Computational Intelligence and Neuroscience, vol. 2014, Article ID 621865, 11 pages, 2014.
Stephan M. Smith, Thomas C. Hildreth, "Threshold-free cluster enhancement: Addressing problems of smoothing, threshold dependence and localisation in cluster inference", NeuroImage, Volume 44, Issue 1, January 2009, Pages 87-98



unpublished
direct interactions
ask many questions

low-risk

often published
more senior

high-risk

preparation / scheduling

- Go over titles/abstracts (3-4h)
- Check speakers against friend/fan-list/referencelist
- Write to PI's if you want to meet

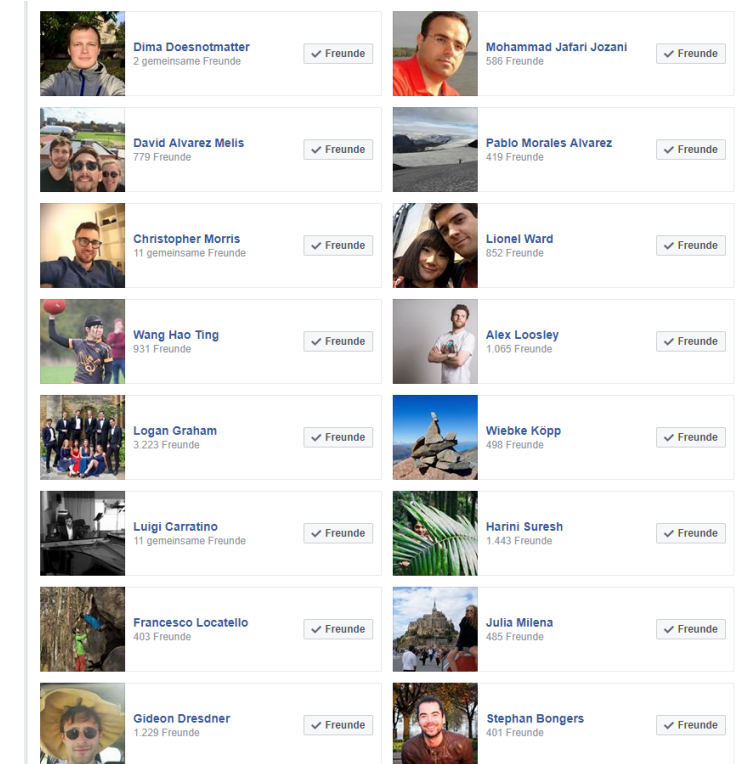
Never try to attend everything. It will make you unhappy

Do I attend everything?

- Talks/Sessions
 - only go to relevant or cool speaker
 - „talk-hop“ between sessions
 - sometimes very bad & boring
- Posters
 - I spent most time here
 - More interaction!
 - sometimes very bad & boring
- Keynotes
 - yes
- Social Events
 - yes

Networking

- Academia is a social endeavour
- Meet & hang out with new people
 - try to explore conference somewhat alone
 - ask for things besides science
 - ask to tag along for dinner
- Always introduce people to each other if you can
- After-conference as important as conference



New friends after summerschool

Poster tips

Robust and Explorative Analysis of EEG

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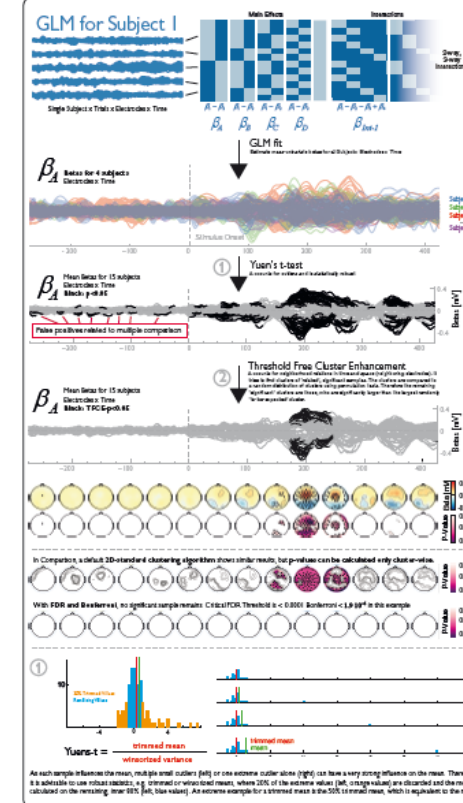
² Department of Neurophysiology and Pathophysiology, University Medical Center Hamburg-Eppendorf

— Background

Explorative data-driven analysis of EEGs is burdened with problems related to the multiple comparisons problem. In a standard EEG experiment testing a large number of electrodes and time points for potential effects is associated with a highly elevated familywise error rate (FWE). Furthermore, correction procedures do not take into account the highly correlated structure of the data, which leads to increased type I errors. In contrast, high inter-subject variability leads to decreased power and thus to a high rate of unreliable effects. In order to overcome these problems, we fitted mixed-effects-invariant GLMEs on single subject trials and in a second step estimated effects based on best-against-over subjects for all time points and electrodes (Perret, 2012). In our experiment, we study the role of prediction of visual stimulation during eye-movement behavior. We displayed peripheral stimuli and, after a delay instructed the subjects to perform saccades onto the stimulus. During the saccade, we embedded the stimulus with a modified version of some of the stimuli. We analyzed pre- and post-saccadic ERP in a 6x2 unbalanced factorial design. The EEG data (4 Channels, 500Hz) were corrected for individual differences by the threshold-free cluster enhancement (TFCE) method. This method, instead of correcting with single individual, relies on use of cluster-based statistics. To account for outliers, we used Van's t -test and bootstrapped-parametric methods of trimmed means as robust statistical methods for group-level comparisons.

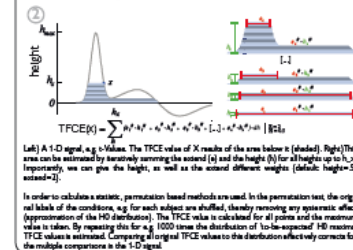
We present this functional analysis stream by exemplary results of a main effect of changing the trial that closely resembles a F300 and interaction model, keeping the same design.

— Methods



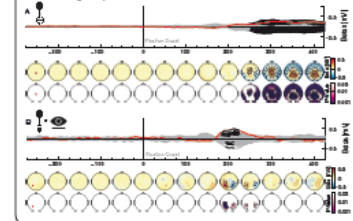
TFCE

The main idea of clustering methods is that multiple neighboring significant values should reflect the same underlying process and, therefore, analyzing clusters is more reliable than assuming independent measurements at each time point.



Exemplary Results

Exchanging a stimulus during a fixating saccade which moves the gaze onto the stimulus, leads to a P300 response. The interaction of stimulus exchange and left/right-saccade reveals an earlier change component around 200ms.



Discussion

Analyzing EEG data using GLMs and TFCE allows for data-driven explorative analyses. The robust statistics and the Threshold-Free-Cluster-Enhancement result in more unbiased results in comparison to 2D-default-clustering. TFCE allows for a correction on every data-point and thus can be more sensitive and fine structured. Naïve Bonferroni or FDR correction often results in an overcorrection and thus loss of power.

References

Cyrl R. Perret, Nicolas Chaveaux, Carl Gaspar, and Guillaume A. Rouaneix, "LIMO EEG: A Solver for Hierarchical Linear/MD Solving of Electroencephalographic Data", *Computational Intelligence and Neuroscience*, vol. 2011, Article ID 321409, 11 pages, 2011.

It is okay to have limited time and tell the presenter to finish soon (be polite!). Don't feel obligated to listen to every poster

If you present: Give a quick tour and details later.
Be confident about your poster, but not too much

Emails

Poster Tips II

- Prepare a very short summary you can give someone at the start of the poster
- Ask for background and adjust your story accordingly

Random tips

- Stay close to the venue if possible
- Ask for hobbies to build personal relationship
- Don't drink if you don't want to!
- Don't get super-drunk
- Don't talk bad about other people
- If you have an idea, write it down immediately
- Try to come up with one question in each talk (even if is simple and you did not ask it)
- Prepare some buisness cards, not many have them – but sometimes they are helpful!
- Ask more senior people:
 - What/Who are must-sees
 - Which talks they go to

Dienstreiseantrag

Universität Osnabrück Dezernat 3 (Finanzen)
3.0 Zentrale Angelegenheiten/Reisekosten
- im Hause -

Antrag auf Genehmigung einer Dienstreise

(Bitte beachten Sie das Merkblatt „Reisekosten an der Universität Osnabrück“)

Name, Vorname	FB/OE	Telefon
Ehinger, Benedikt	IKW FB8	969 - 2245

Grund/Anlass für die Dienstreise und ggf. Begründung für die Notwendigkeit der Teilnahme mehrerer Personen an der Dienstreise			
Ggf. weitere Teilnehmerinnen und Teilnehmer:			
Mitfahrt bei:			
Grundlagen der RK-Abrechnung		Datum	Uhrzeit
Abfahrt von	<input type="checkbox"/> Dienststätte <input checked="" type="checkbox"/> Wohnung: Lange Straße 49 OS	Beginn der Dienstreise	ca.
Reiseweg		Beginn des Dienstgeschäftes	ca.
Reiseziel		Ende des Dienstgeschäftes	ca.
Rückkehr nach	<input type="checkbox"/> Dienststätte <input checked="" type="checkbox"/> Wohnung: Lange Straße 49 OS	Ende der Dienstreise	ca.
<input type="checkbox"/> Die Dienstreise wird mit folgender privaten Reise verbunden: Reiseverlauf bitte auf einem gesondertem Blatt (bitte unbedingt den Privatanteil d. Reise zeitlich genau erläutern)			

* Sofern nicht die Dienststätte angegeben wird, beachten Sie bitte Ziff. 3 des Merkblattes "Reisekosten a. d. Universität Osnabrück"

Beförderungsmittel:	
Hinfahrt	
<input checked="" type="checkbox"/> Bahn/Bus <input type="checkbox"/> Dienst-Kfz <input type="checkbox"/> Flugzeug (bitte begründen ¹⁾) <input type="checkbox"/> Mietwagen/Sonstige (bitte begründen ¹⁾)	
<input type="checkbox"/> privates Kfz §5 Abs. 2 NRKVO (Wegstreckenentschädigung 0,20 €/km mit Begrenzung ohne Sachschadengewährung ²⁾)	
<input type="checkbox"/> privater Kfz §5 Abs. 3 NRKVO (Wegstreckenentschädigung 0,30 €/km ohne Begrenzung m. Sachschadengewährung; bitte begründen ¹⁾)	
Rückfahrt	
<input checked="" type="checkbox"/> Bahn/Bus <input type="checkbox"/> Dienst-Kfz <input type="checkbox"/> Flugzeug (bitte begründen ¹⁾) <input type="checkbox"/> Mietwagen/Sonstige (bitte begründen ¹⁾)	
<input type="checkbox"/> privates Kfz §5 Abs. 2 NRKVO (Wegstreckenentschädigung 0,20 €/km mit Begrenzung ohne Sachschadengewährung ²⁾)	
<input type="checkbox"/> privater Kfz §5 Abs. 3 NRKVO (Wegstreckenentschädigung 0,30 €/km ohne Begrenzung m. Sachschadengewährung; bitte begründen ¹⁾)	
¹⁾ Begründung:	
²⁾ Begrenzung auf 100 Euro pro Reise / Wird nur eine Fahrt, z. B. Hinfahrt durchgeführt, halbiert sich der Höchstbetrag auf 50 Euro.	
Ich besitze eine BahnCard/Ermäßigungskarte z. B. Semesterticket (bitte immer angeben):	
<input type="checkbox"/> nein <input checked="" type="checkbox"/> ja, und zwar <input type="checkbox"/> BC 25 <input checked="" type="checkbox"/> BC 50 <input type="checkbox"/> BC 100 <input type="checkbox"/> Business 25/50 <input type="checkbox"/> Sonstige	



Universität Osnabrück
Dezernat 3 (Finanzen)
3.0 Zentrale Angelegenheiten/Reisekosten
- im Hause -

Antrag auf Reisekostenerstattung

Name, Vorname: Ehinger, Benedikt	FB/OE: IKW
Wohnungsanschrift: Lange Str. 48	Email: behinger@uos.de
IBAN (International Bank Account Number)	
D E 6 2 6 5 0 9 1 0 4 0 0 0 7 9 8 4 5 0 0 2	
* Großbuchstaben	
BIC (Bank Identifier Code)	
G E N O D E S 1 L E U	
Finanzstelle/Fonds:	
Tatsächliche Daten der Dienstreise (ggf. abweichend der Genehmigung):	
Beginn der Dienstreise (Datum/Uhrzeit):	Beginn des Dienstgeschäftes (Datum/Uhrzeit):
Ende des Dienstgeschäftes (Datum/Uhrzeit):	Ende der Dienstreise (Datum/Uhrzeit):
Reiseweg/Reiseziel:	
Die Dienstreise wurde mit Arbeitstagen Urlaub verbunden. (bitte den Privatanteil zeitlich genau auf dem Vordruck "Reiseverlauf" angeben)	
Grund der Dienstreise:	
<input type="checkbox"/> Allgemeine Dienstreisegenehmigung liegt vor.	
Beförderungsmittel:	
Hinfahrt	
<input checked="" type="checkbox"/> Bahn/Bus <input type="checkbox"/> Dienst-Kfz <input type="checkbox"/> Flugzeug (bitte begründen ¹⁾) <input type="checkbox"/> Mietwagen/Sonstige (bitte begründen ¹⁾)	
<input type="checkbox"/> privates Kfz §5 Abs. 1 BRKG (Wegstreckenentschädigung 0,20 €/km mit Begrenzung ohne Sachschadengewährung ²⁾)	
<input type="checkbox"/> privater Kfz §5 Abs. 2 BRKG (Wegstreckenentschädigung 0,30 €/km ohne Begrenzung mit Sachschadengewährung; bitte begründen ¹⁾)	
Rückfahrt	
<input checked="" type="checkbox"/> Bahn/Bus <input type="checkbox"/> Dienst-Kfz <input type="checkbox"/> Flugzeug (bitte begründen ¹⁾) <input type="checkbox"/> Mietwagen/Sonstige (bitte begründen ¹⁾)	
<input type="checkbox"/> privates Kfz §5 Abs. 1 BRKG (Wegstreckenentschädigung 0,20 €/km mit Begrenzung ohne Sachschadengewährung ²⁾)	
<input type="checkbox"/> privater Kfz §5 Abs. 2 BRKG (Wegstreckenentschädigung 0,30 €/km ohne Begrenzung mit Sachschadengewährung; bitte begründen ¹⁾)	
¹⁾ Begründung:	
²⁾ Begrenzung auf 80 Euro pro Reise	
Ich besitze eine BahnCard/Ermäßigungskarte z. B. Semesterticket (bitte immer angeben):	
<input checked="" type="checkbox"/> ja, und zwar <input type="checkbox"/> BC 25 <input checked="" type="checkbox"/> BC 50 <input type="checkbox"/> BC 100 <input type="checkbox"/> Business 25/50 <input type="checkbox"/> Sonstige	
<input type="checkbox"/> nein	

Dienstreiseantrag
At least 1 week before start!
max. 5 work-days of vacation

Reisekostenabrechnung
Put „University of Osnabrück“ on all bills
Hand in bank-statements
max. 6 month after you return
(just do it immediately)

The conference blues



Conferences can be overwhelming

There is a strong selection bias

Have fun! Conferences & people are awesome