Integrating behavioral with psychophysiological data; towards an enhanced understanding of leader behavior?

Render the invisible visible

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- Best practices?
- Integration with other data?
- Data analytical procedures?

"social cognitive neuroscience provides insights as to how managers learn and develop, resulting in theoretical propositions and practical implications" *(McDonald & Tang, 2015)*

COMBINING EDA WITH BEHAVIORAL DATA

- To fully understand the effect of complex leader behavior, it is important to gain insight into the underlying physiological processes (e.g., Heapy & Dutton, 2008; Lee et al., 2012; Marci et al., 2007; Pastor e tal., 2007)

- Calls for more knowledge about “the neurological processes behind a leader's behavior” (Boyatis et al., 2012)

- Potential to inform management theory & prediction (Hannah et al., 2013)

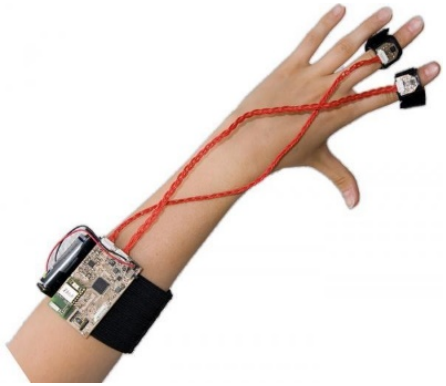
Integration physiological measures/neuroscience & management

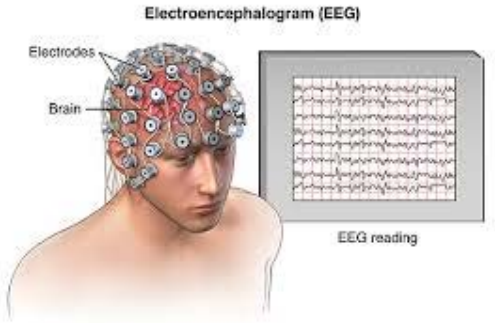
Trend

Studying the brain with a view to understanding human behavior has long been an ideal of social scientists *(Oppenheim & Putnam, 1958)*

Increased accessibility of the expertise, tools, machines and technology

Organizational neuroscience is popular > # of publications in top-tier OB and management *(Bagozzi et al., 2013; Becker & Cropanzano, 2010; Laureiro-Martínez et al., 2014; Lee et al., 2012)*



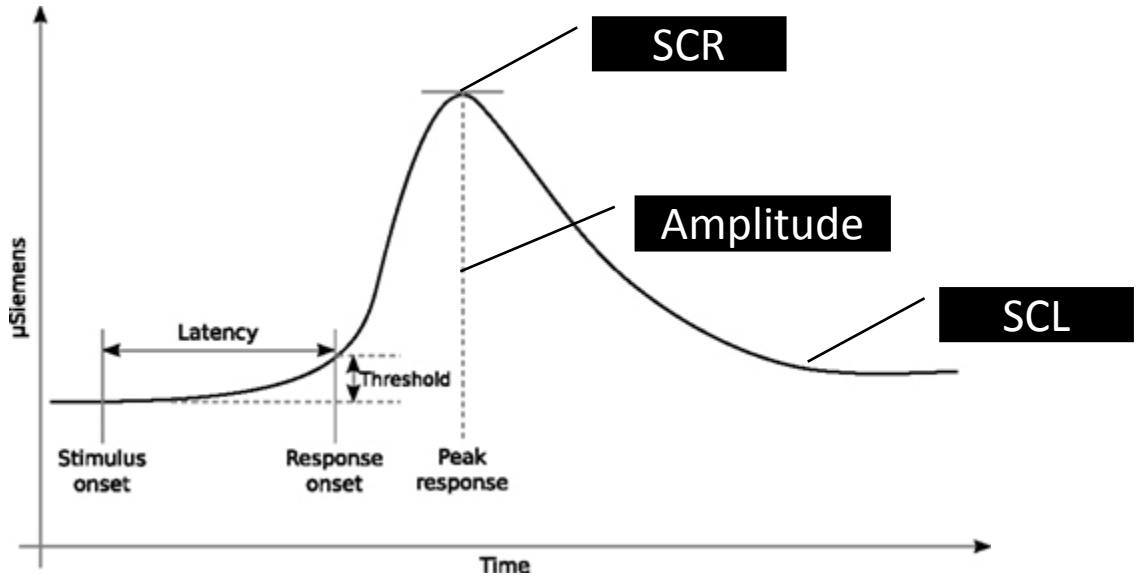


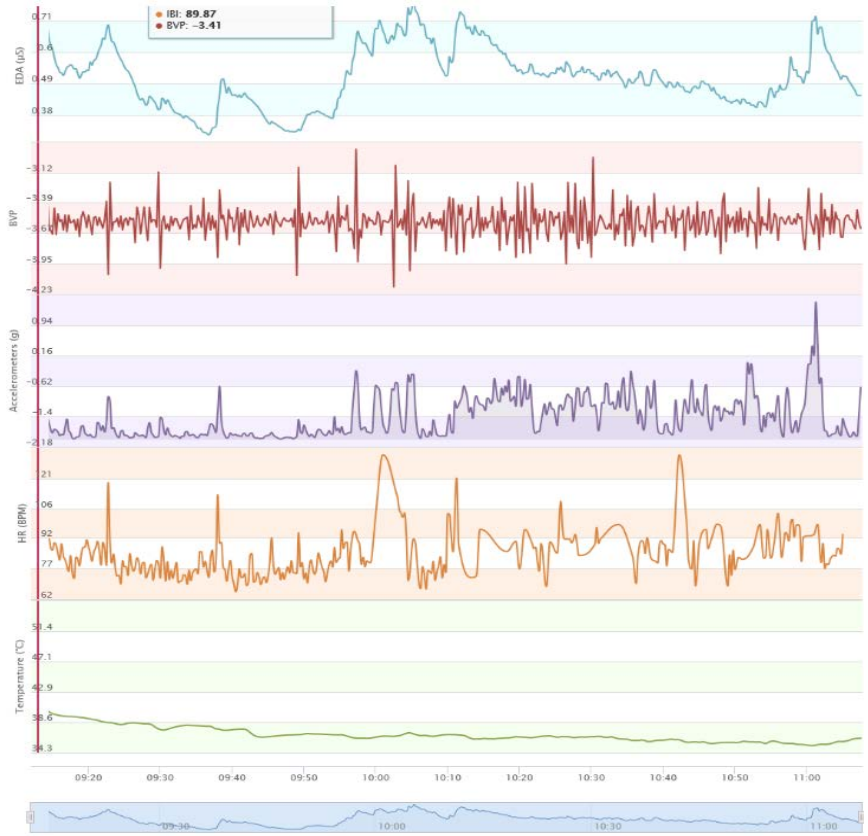
Current research

• Waldman et al., 2011	- qEEG	Inspirational lship
• Molenberghs et al., 2015	- fMRI	Visionary lship
• Bagozzi et al., 2013	- fMRI	Machiavellianism
• Hannah et al., 2013	- qEEG	Decision-making
• Akinola et al., 2014	- Saliva	Social status
• Diebig et al., 2016	- cortisol	Behavior and stress
• Balthazard et al., 2012	- EEG	Transformational lship
• Boyatzis et al., 2012	- fMRI	Resonant/dissonant leaders

The E4

- Most used bracelet in scientific research – empatica manager
- EDA (Electrodermal activity, skin conductance)
- Heart rate
- Heart rate variability
- Movement (acceleration)
- Temperature





Research design

- Multi-modal

Video	Bio-data / Physiology	Survey
		
Observing actual (leader) behavior in field settings Verbal Non-verbal Pattern analysis	Skin conductance	Individual characteristics Follower perceptions about the leader Contextual team influences

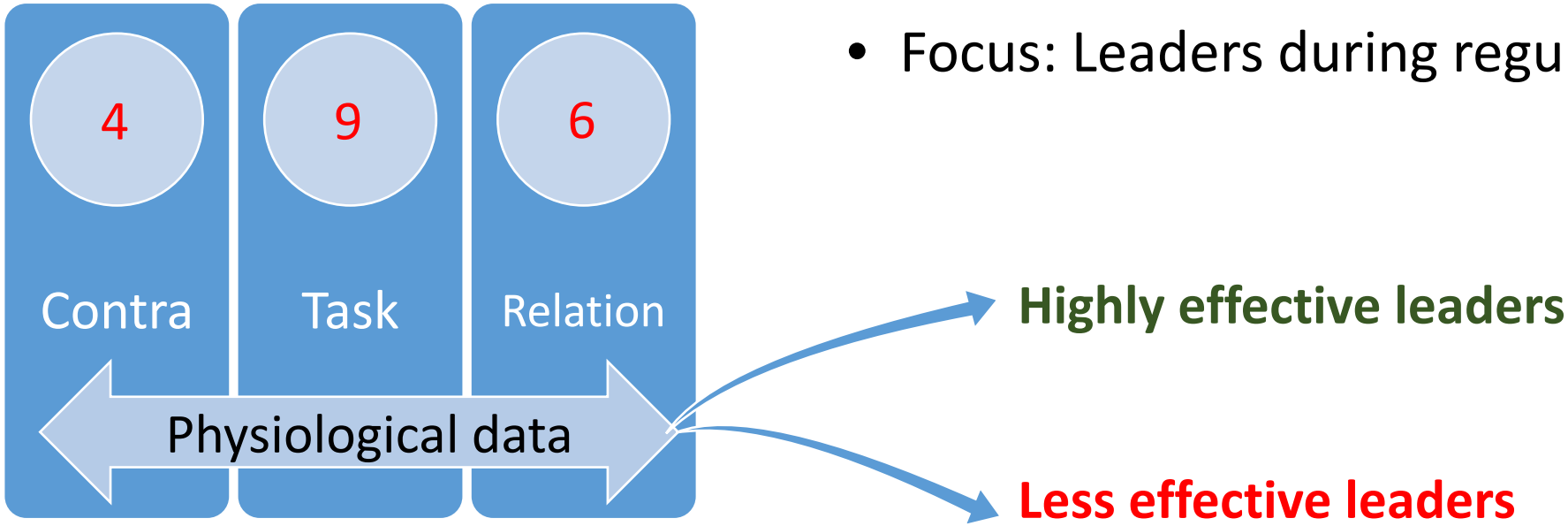
1) No common method/source bias (*Podsakoff, 2003*)
2) Insight in actual behavior *(Amabile et al., 2004; Czarniawska, 2007; Glynn & Raffaelli, 2010; Heath & Hindmarsh, 2007)*
3) Full-range of leader and follower behavior (*Avolio et al., 2003*)
4) Team dynamics: lag-seq and t-pattern analysis *(Bakeman & Quera, 2007; Zijlstra et al., 2011)*
5) Multi-sensory design enables combination of methods to better understand behavior

Challenges

1) Methodological and technical challenges
2) The *So what?* Issue
3) Neuroscience as just another management fad

(Askanasy et al., 2014)

Focus and questions

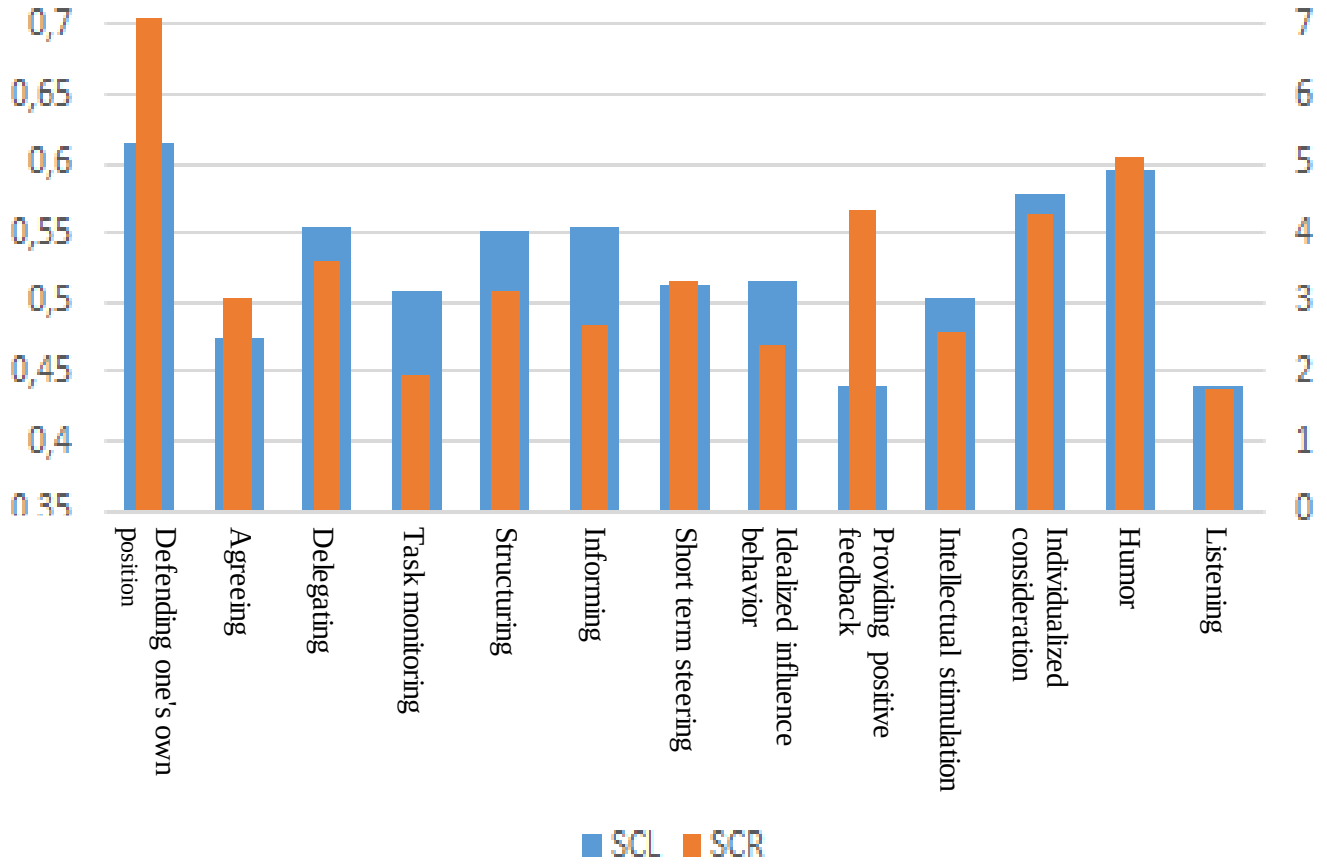


- Focus: Leaders during regular staff meetings

- Goal: explore whether we could bridge methodological and technical challenges and examine how EDA can inform us about (effective) social interactions at work (i.e., how we can use EDA data can be used to improve individual effectiveness)

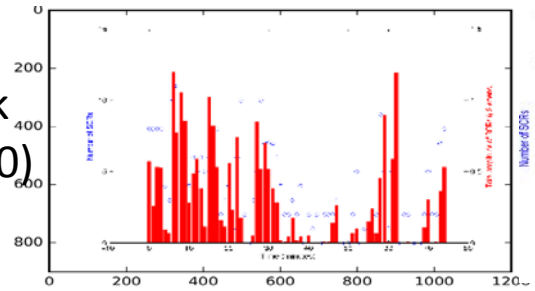
(Fairhurst, 2009; Fairhurst & Uhl-Bien, 2012; Lindebaum & Zundel, 2013; Waldman et al., 2011)

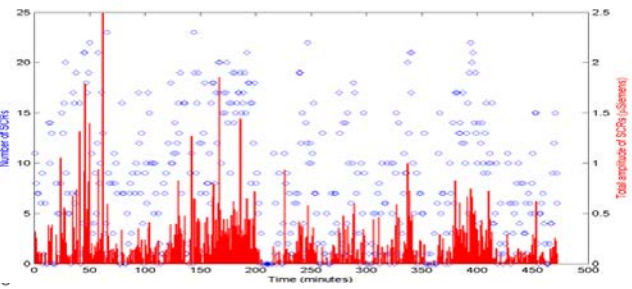
Preliminary analysis

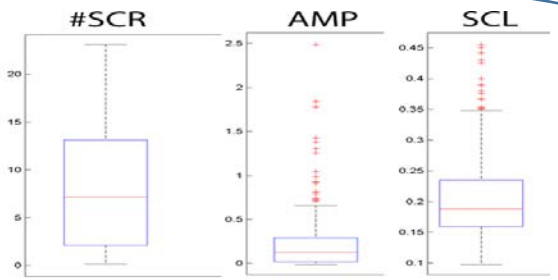


Integration EDA/behavioral data

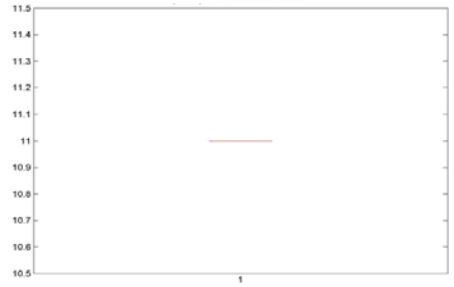
LedaLab/MatLab Formula (Benedek & Kaernback, 2010) Descriptive plots







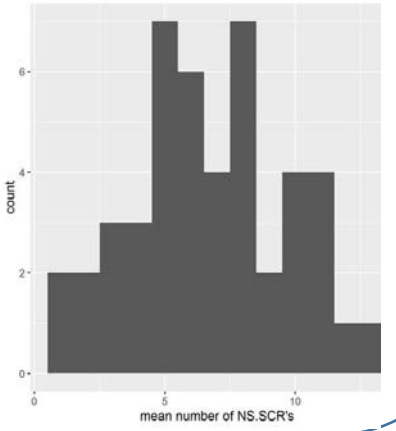
Independently check descriptive Plots (Dawson et al., 2007)



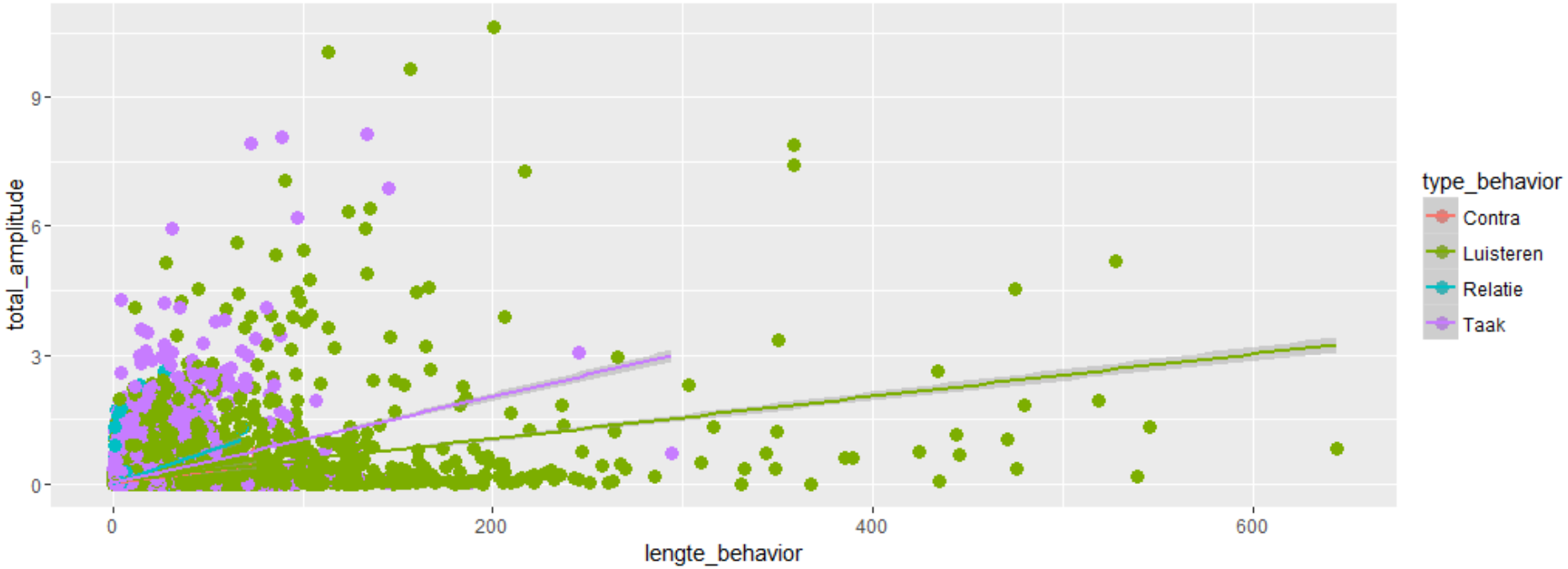
Combine Video / EDA data

	Team nummer	Tijd (UTC)	Begin tijd camera	Tijd start (kloktijd) vergadering	Tijd start vergadering seconden	Tijd einde vergadering (kloktijd)	Tijd einde vergadering seconden	Marker in seconden	Kloktijd marker	Totale duur vergadering in seconden		
2	101	09:13:50 (t	9:13:50	9:14:41	51	11:01:55	6485,92	32	9:14:22	6434,92	101	A000C8-E4	47488
3	102	08:53:04 (t	8:53:04	9:04:18	674,4	10:09:27	4583,04	185	8:56:09	3908,64	102	A000C8-E4	48165
4	103	08:58:29 (t	8:58:29	9:03:57	328,88	9:51:06	3037,2	38 / 40	8:59:07	2708,32	103	A000C8-E4	48847
5	104	7:30:34	9:30:34	9:37:10	396	10:47:57	4643,17	115	9:32:29	4247,17	104	A000C8-E4	49548
6	105	11:31:21	13:31:21	13:33:03	102,82	15:31:21	7200,22	16 / 17	13:31:37	7097,4	105	A000C8-E4	49777
7	107	8:00:54	10:00:54	10:08:43	469,47	11:27:48	5214,67	90	10:02:24	4745,2	107	A00038-E4	55330
8	109	7:34:35	9:34:35	9:38:15	220,8	10:21:27	2877,66	59 (niet g	9:34:34	2656,86	109	A00038-E4	57098
9	111	7:24:20	9:24:20	9:26:42	142,87	11:11:56	6456,2	10-nov	9:24:30	6313,33	111	A000C8-E4	57679
10	112	13:05:47	15:05:47	15:09:45	238,16	16:10:41	3894,28	131 - 132	15:07:58	3656,12	112	A00038-E4	58558
11	113	11:02:29	13:02:29	13:06:59	270,25	13:57:34	3305,26	8-sep	13:02:37	3035,01	113	A000C8-E4	58748
12	114	7:53:39	9:53:39	9:54:26	47,92	11:38:57	6317,8	154 - 155	9:56:13	6269,88	114	A00038-E4	58988
13	115	10:55:51	12:55:51	13:04:00	489,77	15:02:30	7599,36	207 / 208	12:59:18	7109,59	115	A000C8-E4	59040
14	117	10:58:06	12:58:06	13:00:23	137,54	14:05:50	4063,83	178 / 179	13:01:04	3926,29	117	A00038-E4	59873
15	119	10:57:08	12:57:08	13:14:03	1015,1	15:02:00	7492,15	148 / 149	12:59:36	6477,05	119	A00038-E4	60201
16	122	10:59:25	12:59:25	13:04:17	292,8	14:21:52	4947,32	121 / 122	13:01:26	4654,52	122	A00038-E4	60546
17	123	8:11:31	10:11:31	10:39:58	1707,66	11:38:48	5236,6	146 / 147	10:13:57	3528,94	123	A000C8-E4	60745
18	129	6:59:09	8:59:09	9:01:28	139,82	10:22:10	4981,3	114 / 115	9:01:03	4841,48	129	A000C8-E4	62052

Rank-order by stability/ lability



Preliminary result



Future steps in the data analysis

- Comparison of SCR/SCL between listening – non listening
- Comparison of SCR/SCL between relation-oriented – non-relation-oriented behavior

- Difference in SCR/SCL effective and less effective leaders during different follower behaviors

- Event-related skin conductance responses (SCRs)

- Or: just another management fad? (Ashkanasy et al., 2014)

Thank you for your attention!

Questions or remarks?

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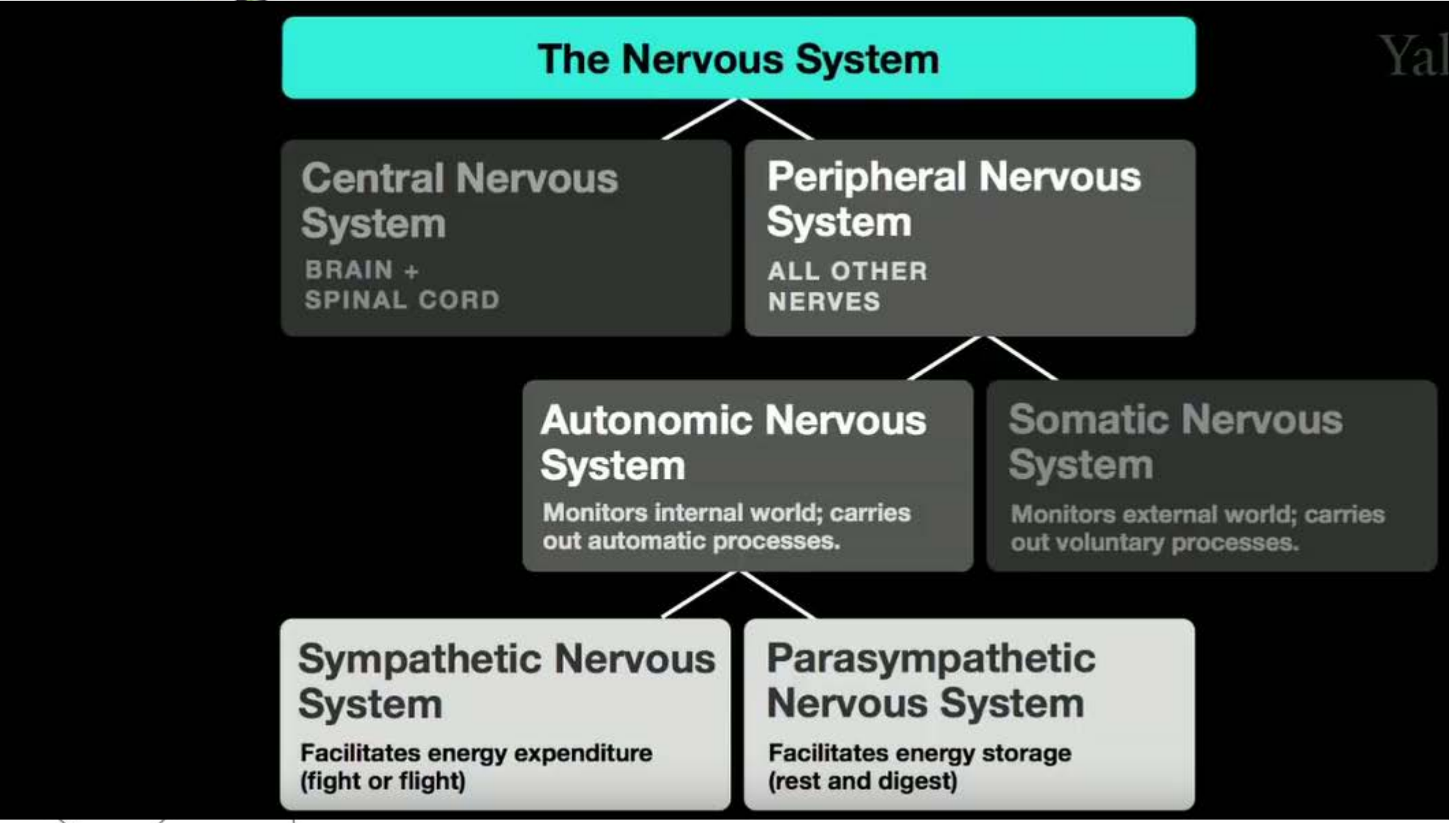
THE VIDEO-OBSERVATION METHODOLOGY

- 'The Observer XT' *(Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000; Spiers, 2004)*
- Behavioral coding scheme (20 mutually-exclusive behaviors, incl. listening)
- Standardization procedure
- 2 independent coders
- Computing the Average IRR (Landis & Koch, 1977)
- Reactivity *(Smith, Mc Phail & Pickens, 1975)* Question followers survey (scale 1-7)

(Bales, 1950; Borgatta, 1962; Nauta, 1996; Bass & Avolio, 2000)

	Behavior	Definition
1.	Showing disinterest	Keeping distance toward followers; Not showing any interest; Not taking any action (when expected)
2.	Defending one's own position	Defending one's own position or opinion; Emphasizing own importance
3.	Providing negative feedback	Criticizing the behavior of followers
4.	Disagreeing	Disagreeing with followers
5a. 5b.	Directing: correcting Directing: delegating	Dividing tasks among followers (without enforcing them); Determining the direction for staff
6.	Verifying	Checking on the current situation; Coming back on previously made agreements
7.	Structuring the conversation	Interrupting when someone is talking; Changing the topic abruptly; Structuring the meeting
8.	Informing	Giving factual information
9a. 9b.	Visioning: own opinion Visioning: long term	Giving own opinion; Explaining long term goals and directions
10.	Agreeing	Agreeing with followers
11.	Intellectual stimulation	Positively stimulating the behavior of followers; Challenging professionally
12.	Individualized consideration	Showing interest for the follower's feelings or situation; Showing empathy; Creating a friendly environment
13.	Positive feedback	Providing positive feedback to followers
14.	Using humor	Making jokes
15.	Personal informing	Giving personal information (e.g., about a home-situation)


The Nervous System
Central Nervous System
BRAIN + SPINAL CORD
Peripheral Nervous System
ALL OTHER NERVES
Autonomic Nervous System
Monitors internal world; carries out automatic processes.
Somatic Nervous System
Monitors external world; carries out voluntary processes.
Sympathetic Nervous System
Facilitates energy expenditure (fight or flight)
Parasympathetic Nervous System
Facilitates energy storage (rest and digest)