EAM2025 XI Conference

23RD - 25TH JULY 2025

Spain Tenerife Canary Islands

European Association of Methodology

The Influence of Time of Day on the Occurrence of Careless and Insufficient Effort Responding

Tobias Deribo & Ulf Kroehne

Universidad de La Laguna
Cabildo de Tenerife
Tagoro
cajasiete
Gobierno de Canarias
Consejería de Universidades, Ciencia e Innovación y Cultura
Agencia Canaria de Investigación, Innovación y Sociedad de la Información
ICI Instituto Canario de Igualdad
tea
hogrefe

Unmotivated Response Behavior

Questionnaires are probably the most frequently used instrument for measuring non-cognitive constructs in educational and psychological research. However:

Potentially low motivation to fill out the questionnaire among participants (e.g., Mead & Craig, 2012)

↓

Careless/Insufficient Effort Responding (C/IER)

↓

Validity of the drawn conclusions, psychometric properties, etc.

Therefore: Increase understanding of the **conditions that lead to lower motivation** to fill out questionnaires, e.g., for inclusion in survey planning

Unmotivated Response Behavior

One influencing factor on response motivation may be the **time-of-day** at which the survey is filled out (e.g., Kouchaki & Smith, 2014; Olsen et al., 2017; Wise et al., 2024)

Focus here on: Survey relating to professional context
In the context of: Unsupervised online surveys (e.g., Kroehne et al., 2021)

Assumption: The time-of-day becomes even more relevant when the survey is job-related but completed outside the work context.

Effect of Time-of-Day on:

The **appearance** of C/IER
The **amount** of C/IER

Sample

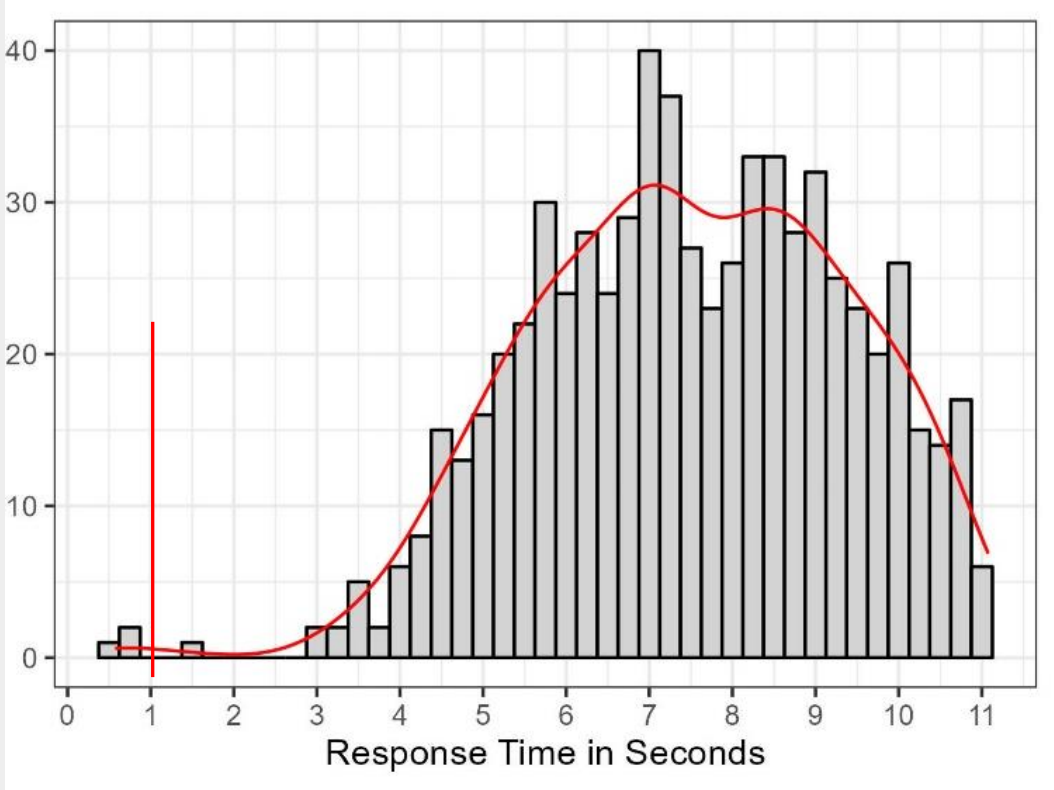
Sample of teachers and pedagogical staff in German schools (https://www.schumas-forschung.de/)

Subsample: finished survey in one go
N = 2,699 teachers and N = 711 pedagocial staff from 196 schools

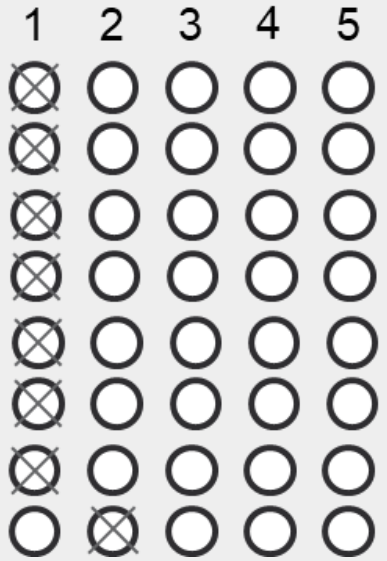
Two data sources to identify C/IER:
Survey data and **logdata-based response times** (Kroehne & Goldhammer, 2021)

Identification of C/IER

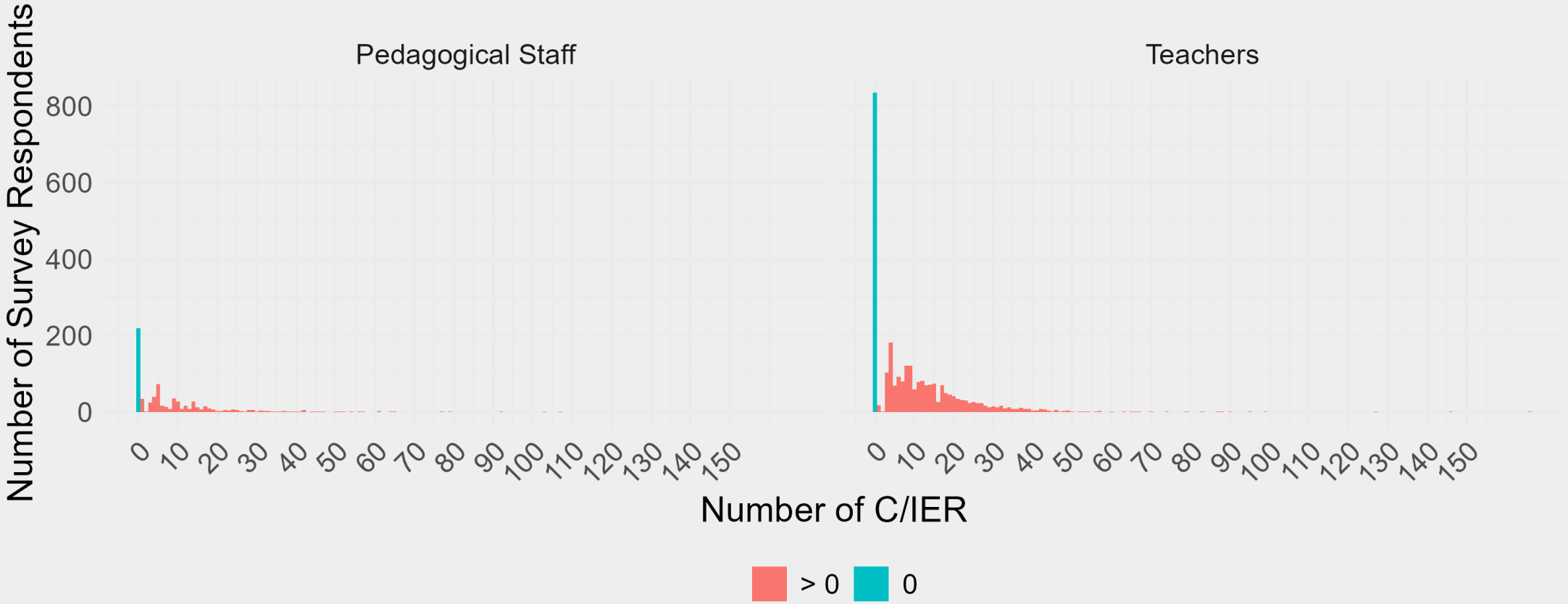
Visual Inspection of response times
(Wise, 2006)



Longstring-Index (Curran, 2016)
Cut Score >= 7/8 for all matrix items



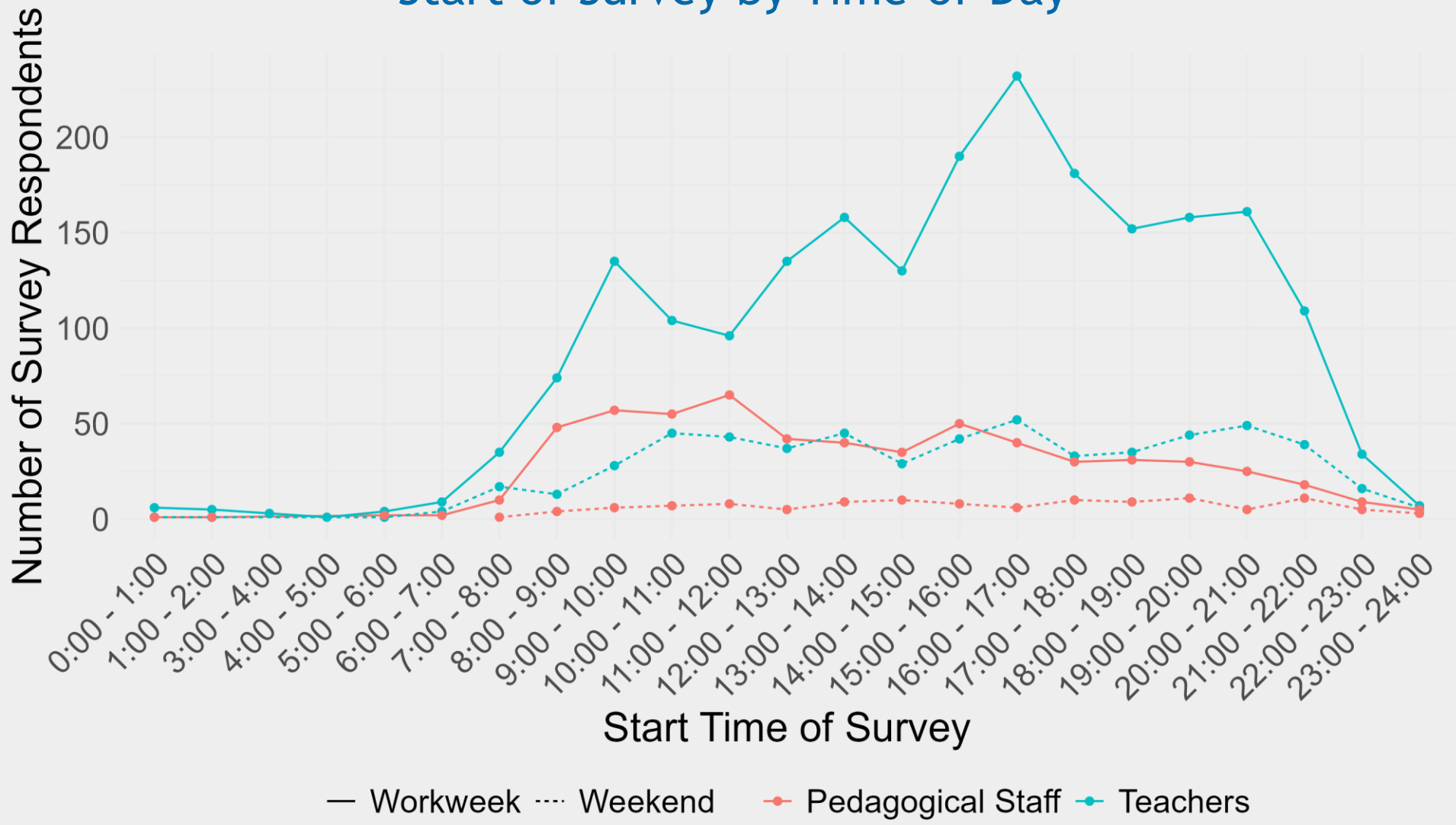
Distribution of C/IER



$C/IER_{Ped.Staff.}$ = 16.89% of all given responses
Median = 5; *SD* = 10.34; *Min* = 0; *Max* = 124

$C/IER_{Teachers}$ = 6.87% of all given responses
Median = 7; *SD* = 12.64; *Min* = 0; *Max* = 166

Start of Survey by Time-of-Day



Statistical Modeling

Bayesian Zero-Inflated Beta Regression (i.e., Ospina & Ferrari, 2010)

Weakly-Informative Priors:

Intercept ~ *student_t*(3,0,2.5)

Regressionscoefficients ~ *N*(0,2)

4 chains with 5000 Iterationen (half als burn-in)

All chains: R_hat < 1.01, Effective Sample Size > 1000 (Bürkner, 2021)

Imputation of missing values with mice (van Buuren & Groothuis-Oudshoorn, 2011)

Classification and Regression Trees (CART; Breiman et al., 1984)

5 Imputed datasets

Predictors

Demographic Variables:

Gender (0 = male; 1 = female)

Psychological Factors:

Work-related fatigue (4 item scale)

Contextual Factors:

Time-of-day, Weekend (dummy coded)

Outcome:

Proportion of C/IER in relation to the possible number of responses (0 = No C/IER; 1= All C/IER)

Results of Regression: Teachers

	Zero-Inflated					Beta			
	PM (Est.Err.)	95% CI	PD	% Change		PM (Est.Err.)	95% CI	PD	% Change
Intercept	-0.92 (0.11)	[-1.14, -0.71]	100%	28.50%	**Intercept**	-2.66 (0.04)	[-2.74, -2.58]	100%	6.50%
Gender[1]	0.13 (0.11)	[-0.08, 0.34]	87.78%	2.72%	**Gender[1]**	-0.02 (0.04)	[-0.10, 0.07]	61.70%	-0.12%
Work-related fatigue[3]	-0.03 (0.05)	[-0.12, 0.06]	75.63%	-0.61%	**Work-related fatigue[3]**	0.00 (0.02)	[-0.03, 0.03]	52.00%	0.00%
16:00 to 08:00[2]	0.09 (0.09)	[-0.10, 0.27]	82.34%	1.87%	**16:00 to 08:00**	0.01 (0.04)	[-0.06, 0.08]	60.70%	0.06%
Weekend[2]	-0.09 (0.12)	[-0.31, 0.14]	78.90%	-1.80%	**Weekend[2]**	0.04 (0.04)	[-0.04, 0.13]	84.98%	0.24%

Annotations. Reference groups: [1]Male. [2]08:00 to 16:00 in workweek. [3]Z-standardized. N = 2,699. PM = Posterior Mean. PD = Probability of Direction.

Results of Regression: Pedagogical Staff

	Zero-Inflated					Beta			
	PM (Est.Err.)	95% CI	PD	% Change		PM (Est.Err.)	95% CI	PD	% Change
Intercept	-0.92 (.32)	[-1.93; -0.65]	100%	28.50%	**Intercept**	-2.53 (.15)	[-2.85; -2.26]	100%	7.38%
Gender[1]	0.01 (.23)	[-0.42; 0.44]	50.73%	0.20%	**Gender[1]**	0.10 (.10)	[-0.12;0.30]	84.23%	0.71%
Work-related fatigue[3]	0.17 (.09)	[0.01; 0.34]	98.03%	3.59%	**Work-related fatigue[3]**	-0.10 (.04)	[-0.20;-0.03]	99.14%	-0.65%
16:00 to 08:00[2]	0.38 (.18)	[0.02; 0.73]	98.10%	8.32%	**16:00 to 08:00[2]**	0.04 (.08)	[-0.13; 0.21]	69.98%	0.28%
Weekend[2]	-0.04 (.24)	[-0.51; 0.42]	56.74%	0.81%	**Weekend[2]**	0.14 (.10)	[-0.25; 0.30]	91.59%	1.02%

Annotations. Reference groups: [1]Male. [2]08:00 to 16:00 in workweek. [3]Z-standardized. N = 711. PM = Posterior Mean. PD = Probability of Direction.

Key Results

For Teachers: C/IER appears stable regardless of time-of-day or fatigue. Survey timing is less critical.

For Pedagogical staff: Show increased engagement and lower C/IER when working outside daytime hours or having high work-related fatigue

Potential Reasons:

Higher Flexibility? Better Alignment?
Voice Behavior (i.e., LePine & Van Dyne, 1998)?

Limitations:

Mismatch between survey timeframes and actual work routines. For many teachers, working during evenings or weekends is common.

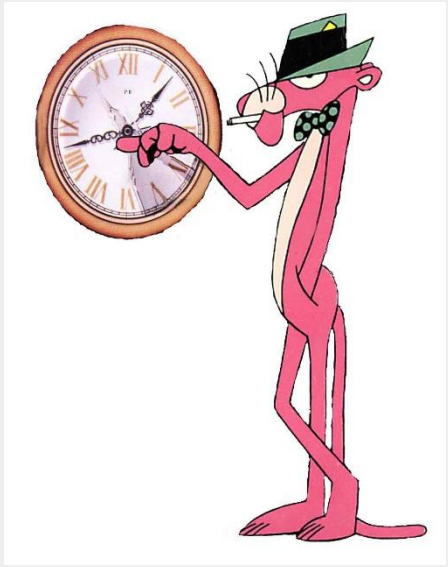
Future Research:

Explore mechanisms, refine time-of-day (i.e. by clustering), clusters on school level, etc.

Implications for Practice:

Understanding when participants are most cognitively and motivationally available may help optimize survey administration. For example: **structural support from schools** (like built-in time)

Thank you for your attention!



"We cannot direct the wind, but we can adjust the sails."
Dolly Parton

Contact Information: Tobias Deribo; DIPF | Leibniz-Institut for Research and Information in Education; t.deribo@dipf.de