

# Report on **P**rogress with **R**egistry for **R**esearch on the **R**esponsible **C**onduct of **R**esearch (**RRRCR**)

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Who am I (that is, What do I do)?

- 1997—Present Full professor of Methods of Psychological Research, Tilburg University (TiU)
- 2000—2010 Head Department of Methodology and Statistics, TiU
- 2010—2011 President of the Psychometric Society
- 2011—2017 Dean of the School of Social and Behavioral Sciences, TiU
- 2011—Present As administrator involved in a couple of integrity scandals

And so on

# Why preregistration?



### Weather forecasting:

- “Predicting” *yesterday’s* weather is no big deal, but you can learn a lot from studying the weather in the previous period, e.g., look for patterns that repeat and the conditions that repetitions share; **inductive** process, may give rise to theories
- From theories deduce hypotheses, and empirically test the hypotheses; aim is to improve predicting *tomorrow’s* weather; **deductive** process

Reichenbach (1938)

**Context of discovery** (of knowledge): Refers to the psychological thought processes as they actually occur in scientific discovery or inference. The way **existing “data”** enable

- A meteorologist to infer a theory about weather systems
- A health researcher to discover relations between variables

**Context of justification:** Refers to logical analysis of the truth of the “knowledge” discovered, involves scientific procedures for establishing the (empirical) validity of a prediction. Concretely,

- The correctness of the prediction of the weather in the next ten days
- The resilience of the hypothesis when faced with newly collected data

## Nosek, Ebersole, DeHaven, & Mellor (2018)

Nosek, B. A., Ebersole, C. R., DeHaven, A. C., & Mellor, D. T. (2018). The preregistration revolution. *PNAS*, *115*, 2600-2606.

**Postdiction:** Generating new ideas based on **existing** data, exploring patterns that support an idea or generate a new idea; that is, **exploration** to generate hypotheses

**Prediction:** Testing hypotheses inspired by existing data in **newly** collected data, using

- Frequentist approach: Test null hypothesis against alternative hypothesis
- Bayesian approach: Identify the hypothesis that receives most support from data

Notice:

Data are noisy, contain many unexpected and unrepeatably signals; **exploration** finds those signals and takes them seriously; see Ioannidis (2005)

Ioannidis, J. P. A. (2005). Why most published research findings are false. *PLoS Med*, *2*(8), e124.

**Preregistering** your research—committing yourself to an *a priori* plan—limits your possibilities to present results as if you predicted them when you actually found them by **exploring** your data

Goals:

- Self-protection: temptation to play with your data is irresistible
- Publish results for what they are; context must be made explicit

Item from **statistics exam** contains options illustrating data exploration with the purpose of making hypothesis testing look like prediction when in fact it is not:

24. A researcher expects that the mean anxiety level is greater than 25 ( $H_1: \mu_X > 25$ ), so that the null hypotheses is  $H_0: \mu_X \leq 25$ . In a sample, she finds  $M = 23$ . Based on the sample results, the researcher should
- Replace the alternative hypothesis by  $H_2: \mu_X < 25$  and then test  $H_0: \mu_X \geq 25$  against  $H_2$
  - Given the sample results, replace a one-sided test by a two-sided test
  - Refrain from testing and draw a conclusion based on the sample alone



## Amsterdam Agenda

Establish a *Registry for Research on the Responsible Conduct of Research* (RRRCR)

Registration should at least contain 6 key elements outlined in the Amsterdam Agenda:

- **Problem.** Shortcomings one addresses, e.g., selective reporting, misuse of statistics
- **Impact.** Estimate of impact of shortcomings on trustworthiness research, responsible use of research funds, etc.
- **Intervention.** How plan to address identified shortcomings? E.g., quality checks, training, encouragement responsible behavior
- **Hypothesis or Anticipated Outcomes.** Changes expected as result of intervention
- **Assessment.** How does one plan hypothesis testing and assessing whether outcomes are as expected
- **Data sharing.** How data, qualitative and quantitative, will be shared

After registration, upload full study protocol, data-analysis plan, data set, and reports describing results

## What are we going to do?

Provide you with feedback on the degree to which the Amsterdam Agenda resonated among researchers; that is, **You!**

**Data** come from registration files for 6<sup>th</sup> WCRI (24 April 2019, probably not final)

### Independent Variables

- **Presentation Mode** (1 = paper, 2 = poster)
- **Early Career Scholar** (0 = No, 1 = Yes)
- **Topic of paper/poster** (9 topics: 1—Manag Conduct; 2—Cult. Diff. Res; 3—ResConRes Education; 4—Improv Transp; 5—Replic, Reprod, ResWaste; 6—Assess Res & Researchers; 7—QRPs; 9—Publ Ethics; 24—Integ Innov & Impact)
- **Category of research** (1 = Qualitative, 2 = Quantitative, 3 = Descriptive)
- **Continent presenter** (6 continents)
- **Discipline** (8 disciplines: 1—Ethics, Integrity, Data Quality; 2—Exact Sciences; 3—Human Sciences; 4—Library, Information; 5—Medicine, Health; 6—Publishing, Journals; 7—Governance, Funding, Support; 8—Non-Academic)

### Dependent Variables

- **Preregistration** (0 = No, 1 = Yes)
- **Registry** (1 = RRRCR; 2 = OSF; 3 = Other)
- **Completeness** (0 = 0 entries; 1 = 1—4 entries; 2 = 5—6 entries; 8 = Wrong URL; 9 = Diff Title; 10 = No Info; 11 = Request Sign In / Access)

N = 308 papers and posters (24 April 2019), Frequencies Dependent Variables

	<u>RespCat</u>	<u>#</u>	<u>%/308</u>	<u>%/56</u>
Preregistration	No	250	81	
	Yes	58*	19	
Registry	RRRCR	21	7	37
	OSF	20	6	36
	Other	15	5	27
	None	252	82	
Completeness	0 entries	2	1	4
	1-4 entries	7	2	12
	5-6 entries	14	4	25
	No Info	7	2	12
	Diff Title	2	1	4
	Req Sign In	10	3	18
	Wrong URL	14	4	25
	None	252	82	

58\*: 2 participants provided no further information, hence columns Regis and Compl add to 56

## Conclusions

- 19% (58) of the 6<sup>th</sup> WCRI participants preregistered; 81% did not
- Of 58 participants who preregistered,
  - 56 provided information about registry and completeness of preregistration; of them
    - 41 used RRRCR/OSF; basically, the same thing
    - 21 provided info on at least 1/6 entries of the Amsterdam Agenda, 14 of them on 5—6 entries
    - 24 provided URLs requiring to sign in or that led to another (irrelevant) site, such as a general statement of a university about research integrity

**Homework** for next conference: **everybody preregister**

		<u>Preregistered</u>		
		<u>%No</u>	<u>%Yes</u>	<u>#</u>
Category	Qualitative	77	23	82
	Quantitative	74	26	125
	Descriptive	96	6	101
opinion, review, case study				
Discipline	Ethics, Integrity	92	8	76
	Exact Sciences	80	20	20
	Human Sciences	73	27	55
	Library, Information	87	13	8
	Medicine, Health	76	24	112
	Publishing, Journals	94	6	16
	Governance, Funding	80	20	15
	Non-Academic	67	33	3

## Conclusions:

- No difference between Qualitative and Quantitative
- Guidelines needed for Descriptive Research?
- Little preregistration for Ethics and Integrity background; however, 51% of the presentations there are Descriptive (not tabulated)

## Main Conclusions

- 19% preregistration may look modest, **but it is a start!**
- **Similar results** were found for
  - clinical trials reported in Top 5 General Medicine Journals (Ioannidis, Caplan, & Dal-Ré, 2017): 9 of 67 studies were “perfectly reported”
  - absence preregistering changes in research published in *Psych.Science* (article not published yet)
- Preregistration involves a working routine **completely different** from what we are used to; takes discipline and time; training, job requirement?
- Preregistration must become routine in **academic education**; students pick it up easily, because they do not have a routine they first have to shake off
- I found the 6 key elements outlined in the Amsterdam Agenda **not unambiguous**, and had difficulty defining them for my own study
- **We need to improve ourselves for the next conference: 7<sup>th</sup> WCRI**

# Thank You

Suggestions are welcomed

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