



Forschungsinstitut
für Nutztierbiologie

The benefits of bringing interdisciplinary perspectives to your research

Liza R. Moscovice, Psychophysiology Working Group

moscovice@fhn-dummerstorf.de

21. November 2024 · Dummerstorf

Overview

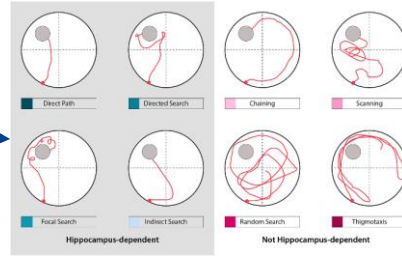


- **How interdisciplinary synergies can inform your research**
 - My own path
- **Conceptualization**
 - Broadening your perspectives
- **Funding**
 - From basic research to applied value
 - EU training and research opportunities for PhD students
- **Methods**
 - Multi-lab approaches
 - Interdisciplinary tools for analyses
- **Writing and dissemination**

My interdisciplinary research experience



BA in **Neuroscience**



Laboratory technician in
Neurobiology lab



PhD in **Psychology**



Postdoc in **Biology Dept**



Postdoc in
Anthropology Dept.

Scientist in Animal
Behavior and Welfare



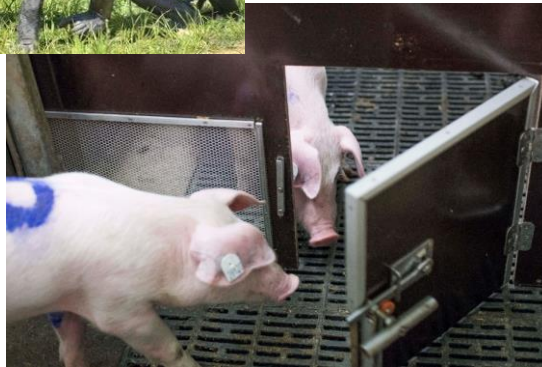
What links my career path?



- **QUESTION:** How do animals form social relationships and what benefits do they receive from them?



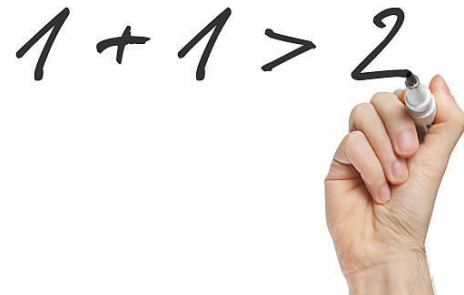
- **METHODS:** non-invasive approaches to link behavior and physiology



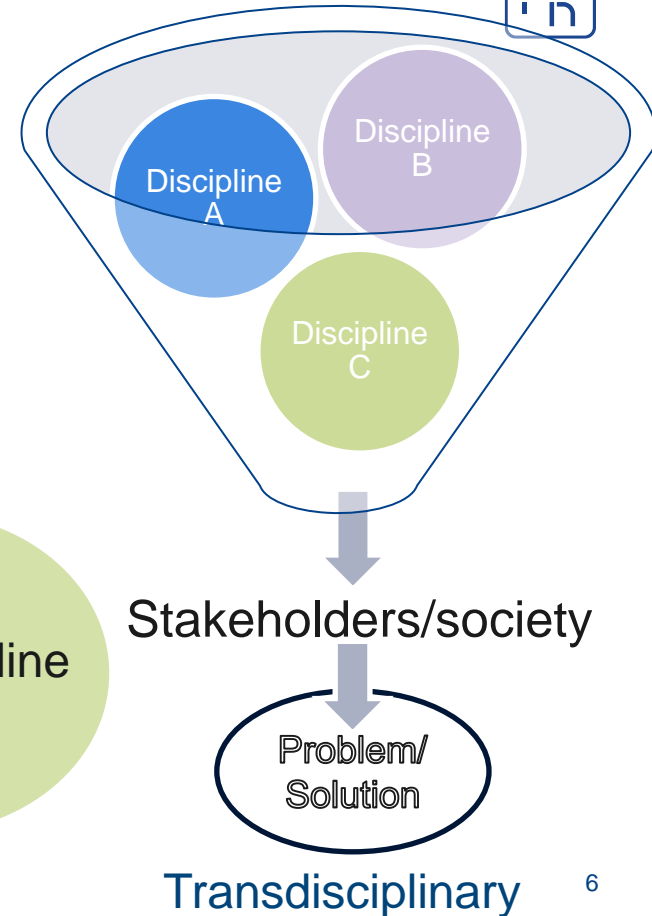
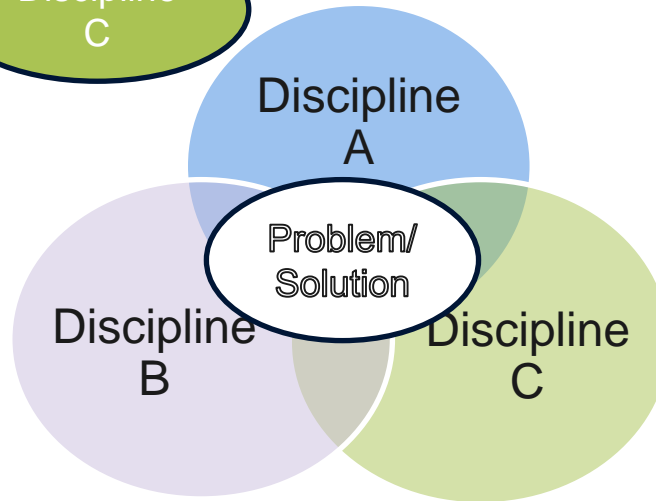
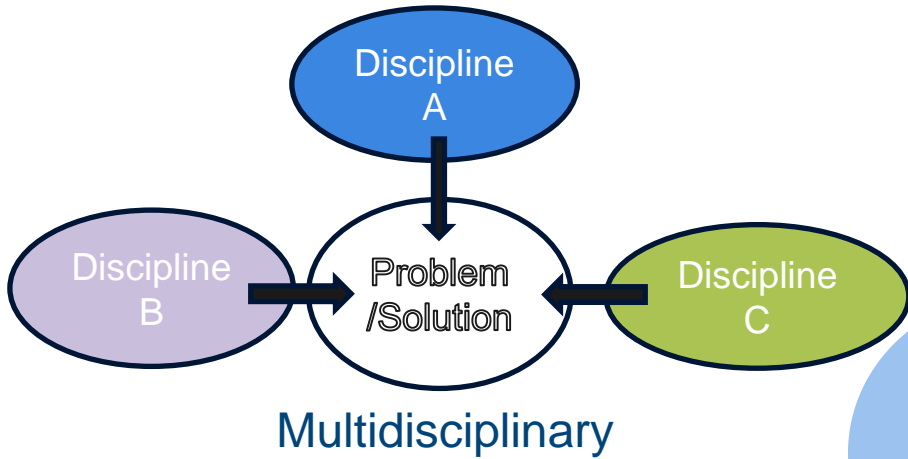
What is interdisciplinary research?



- „Interdisciplinary research is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to *solve problems whose solutions are beyond the scope of a single discipline or area of research practice.*” Natl. Academies of Sciences, Engineering and Medicine (2005)



What is interdisciplinary research?



Using interdisciplinary perspectives to develop your research topic



- Choose a research topic that is meaningful to you!
- Broaden your perspective- through courses, lectures and reading that make your approach unique
- Seek cross-institute and interdisciplinary collaborations- *this can start with your committee members!*
- Identify the broader implications of your work
 - Veterinary medicine as means to promote animal welfare

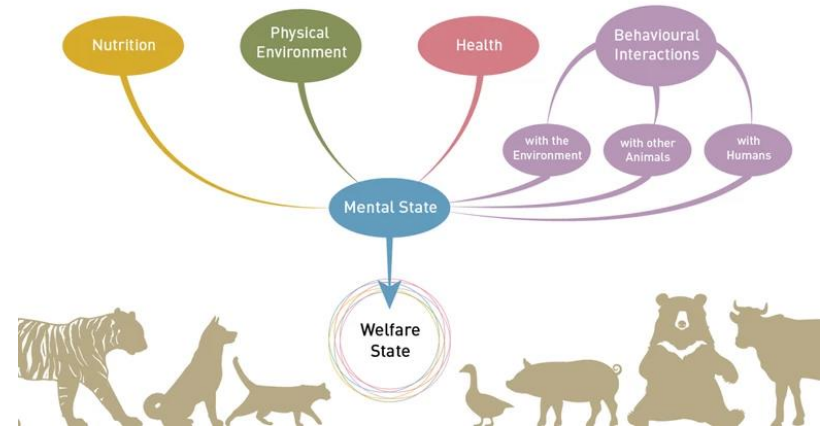
Interdisciplinary perspectives in animal welfare sciences



Table 1.1. Examples of how different perspectives of animal welfare have influenced the application and integration of various (sub)disciplines.

Context	Perspectives	Evaluation	(Sub)disciplines
Schools of thought			
Animal welfare is...	...when the animal is healthy	Health	Veterinary sciences, immunology, virology, proteomics, etc.
	...when the animal leads a natural life	(Evolution of) behaviour	Ethology, evolutionary biology, genetics, behavioural ecology
	...when the animal has positive emotions	Indirect evaluation of emotional state	Cognition, cognitive psychology, (affective) neuroscience, psychology, ethology, comparative psychology
	...when the animal has a good life	Quality of life	Human medical sciences, positive psychology, neuroscience, cognition

Camerlink, 2022



Using interdisciplinary perspectives to develop your research topic

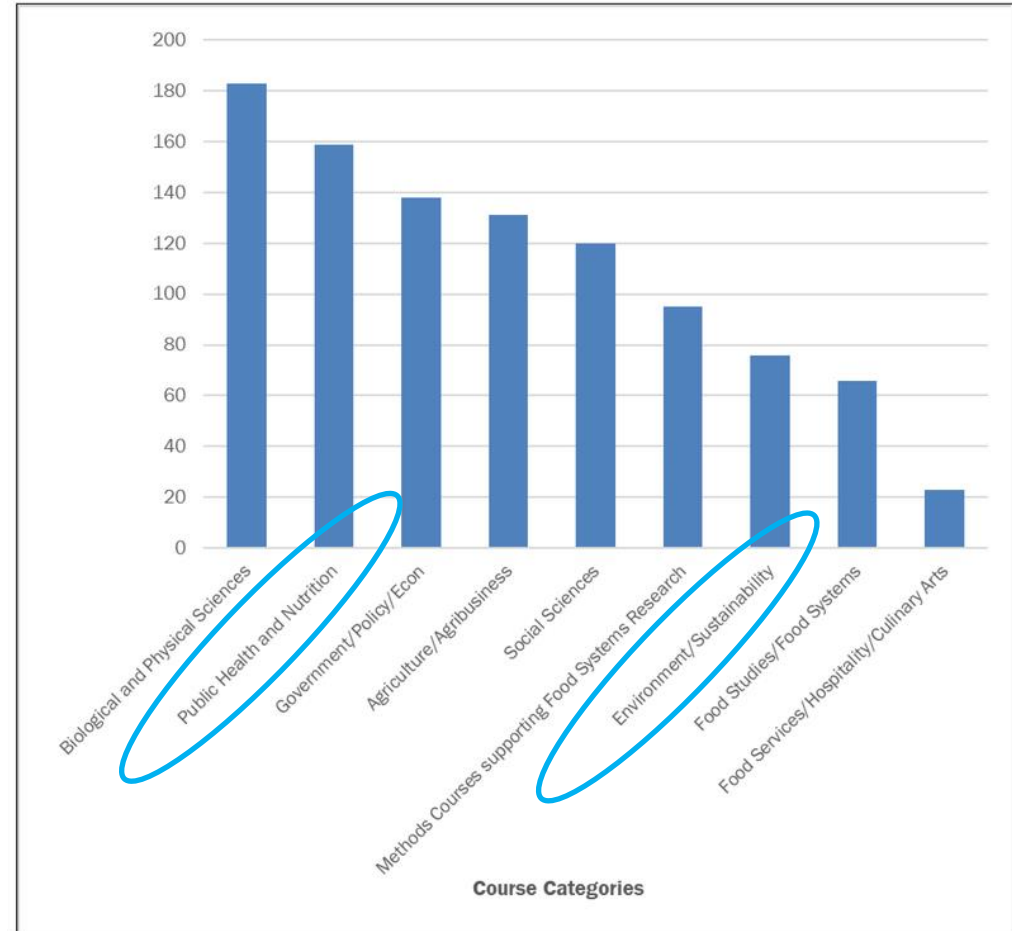


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- Identify the broader implications of your work
 - Veterinary medicine as means to promote animal welfare
 - Food sciences as means to promote environmental sustainability

Interdisciplinary perspectives in food sciences



Interdisciplinary food-related academic graduate program courses in the USA by category (Hartle et al. 2017)



Using interdisciplinary perspectives to develop your research topic



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- Seek cross-institute and interdisciplinary collaborations- this can start with your committee members!
- Identify the broader implications of your work
 - Veterinary medicine as means to promote animal welfare
 - Food sciences as means to promote environmental sustainability
 - Farm animals as models of human behavior and physiology (remember alternative is often rodent!)

Interdisciplinary perspectives in animal sciences



Pig model of early life adversity (ELA)

Using interdisciplinary perspectives to develop and expand your research topic



- **Trust your instincts and be open to new discoveries**

Pay attention to-

- **Rare events-** they can lead to novel discoveries



Conceptualization

- Pay attention to anecdotes and rare behaviors

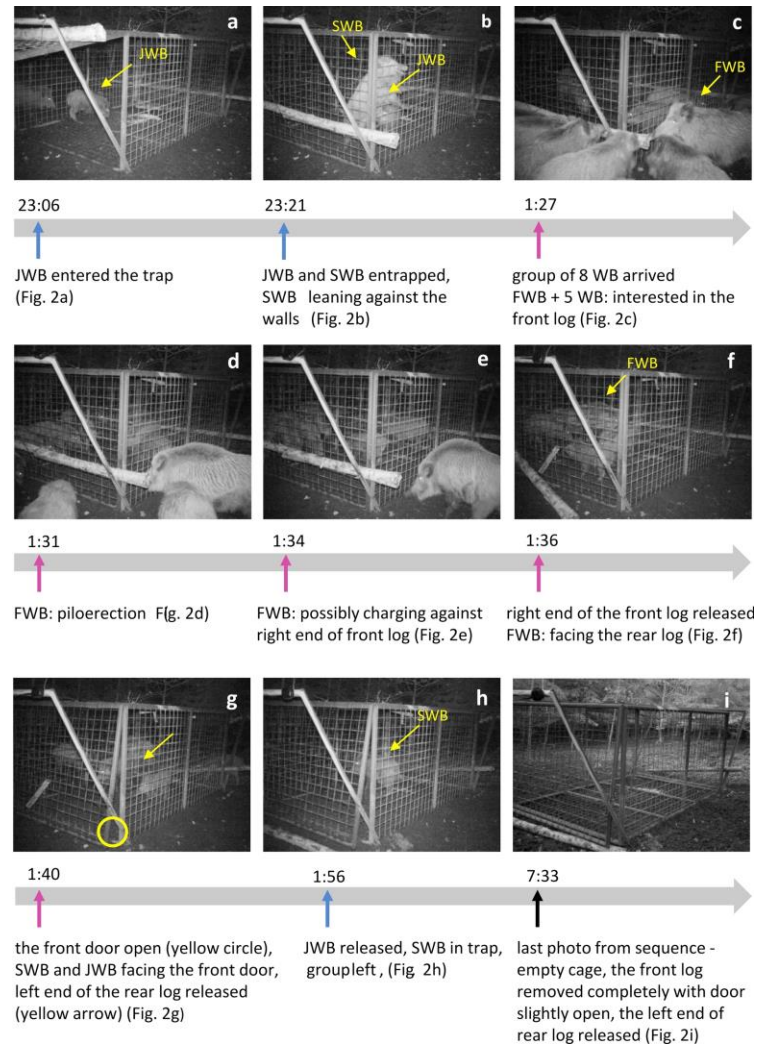


scientific reports

OPEN Observation of rescue behaviour in wild boar (*Sus scrofa*)

Michaela Masilková, Miloš Ježek, Václav Silovský, Monika Faltusová, Jan Rohla, Tomáš Kušta & Hynek Burda

Check for updates



Conceptualization



■ Anecdotes can inspire experimental studies



PROCEEDINGS B

royalsocietypublishing.org/journal/rspb

Research



Cite this article: Moscovice LR, Eggert A, Manteuffel C, Rault J-L. 2023 Spontaneous

Spontaneous helping in pigs is mediated by helper's social attention and distress signals of individuals in need

Liza R. Moscovice¹, Anja Eggert², Christian Manteuffel¹ and Jean-Loup Rault³

¹Institute of Behavioural Physiology, and ²Institute of Genetics and Biometry, Research Institute for Farm Animal Biology (FBN), 18196 Dummerstorf, Mecklenburg-Vorpommern, Germany

³Institute of Animal Welfare Science, University of Veterinary Medicine, 1210 Vienna, Austria



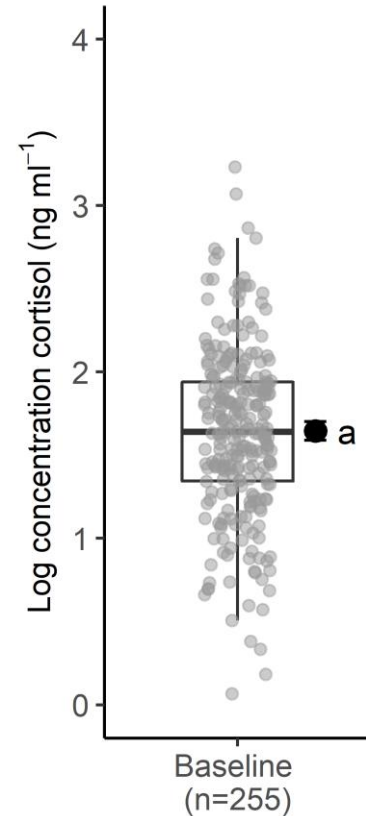
Using interdisciplinary perspectives to develop and expand your research topic



- **Trust your instincts and be open to new discoveries**

Pay attention to-

- **Rare events-** they can lead to novel discoveries
- **Outliers in datasets-** they can help to understand sources of individual variability
- **Different perspectives-** share analyses (and hunches!) with colleagues and collaborators from different disciplines



Overview

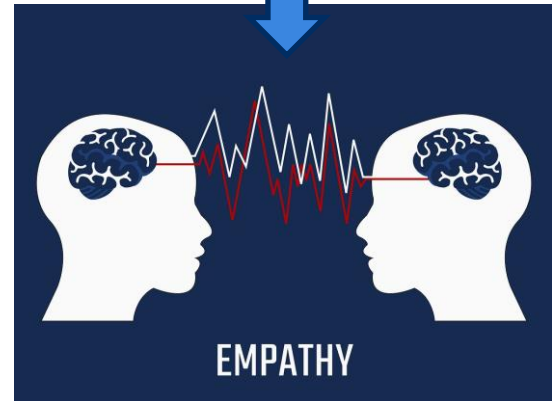


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Using interdisciplinary perspectives to get funding!



- Most effective grant writing incorporates two aspects:
- **Basic research** to understand important biological processes
 - Highlight why your study species or environment, or approach is needed
- **Applied value** of your research
 - Explain how your research can help to address bigger problems!



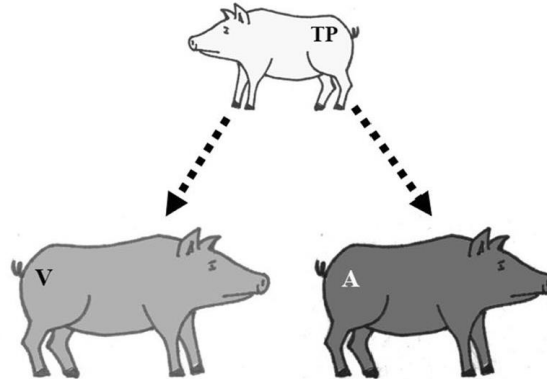
Why study helping behavior in pigs?



- **Basic research** to understand biological precursors of human empathy



Yawn contagion
(Norscia et al., 2021)



Consolation
(Cordoni et al., 2022; Lopez-Caicoya et al. *in prep*)



Rescue behavior
(Masilkova et al. 2021)

Why study helping behavior in pigs?



mdr WISSEN

• Klima & Umwelt Medizin Psychologie Weltraum Geschichte Naturwissenschaft Bildung

MDR.DE > Wissen > Nachrichten



WISSEN-NEWS

Schwein befreit Schwein: Hilfsbereitschaft unter Tieren

02. August 2023, 12:54 Uhr

Happiness comes from trying to make others feel good, rather than oneself

Liudmila Titova & Kennon M. Sheldon

Pages 341-355 | Received 02 Jun 2020, Accepted 24 Feb 2021, Published online: 08 Mar 2021

“ Cite this article <https://doi.org/10.1080/17439760.2021.1897867>



Full Article

Figures & data

References

Supplemental

Citations

Metrics

Reprints & Permissions

Read this

Applied value in:

- Highlighting pigs social needs and abilities
- Promoting agency by giving pigs more control over their environments
- Promoting the spread of positive emotions in social groups

Your turn...



- **Basic research-** How can your research help to understand an important biological process?
- **Applied value-** How can your research help to address a bigger problem?



Using interdisciplinary perspectives to get funding



- The EU is on your side!

HORIZON EUROPE- e.g. EUPAHW

<https://research-and-innovation.ec.europa.eu/funding/>

WEAVE LEAD AGENCY PROCESS

<https://www.dfg.de/en/research-funding/funding-opportunities/>

COST ACTIONS- e.g. LIFT- Can join at any time!

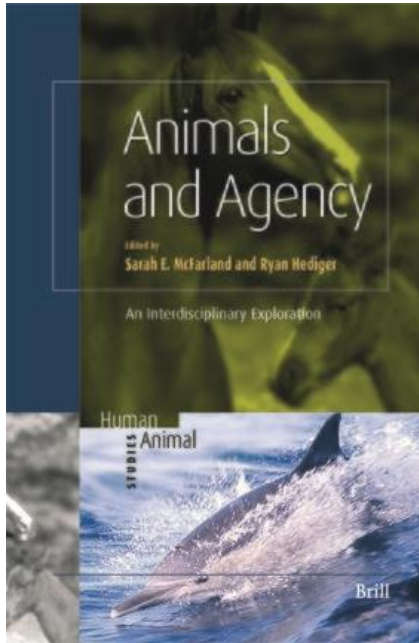
<https://www.cost.eu/>

Training opportunities in interdisciplinary methods

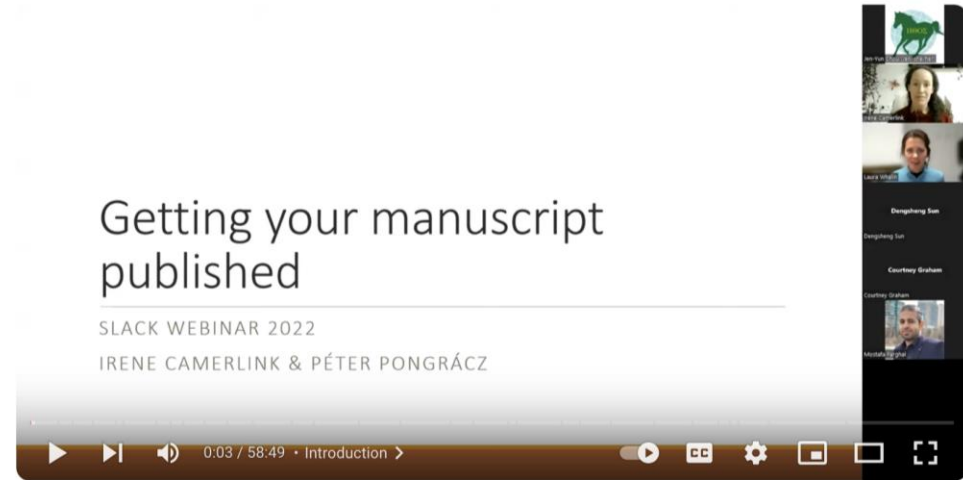


- COST ACTION LIFT:
<https://liftanimalwelfare.eu/>
- “The overall aim of LIFT is to bring cohesion to EU scientific research into positive animal welfare while ensuring that knowledge, understanding and future agendas are aligned with non-academic stakeholders”
- Training schools, webinars and grants for short-term studies

Training opportunities in interdisciplinary methods



- **LIFT interdisciplinary journal club- over zoom**



- **LIFT Webinars- available on utube**
<https://www.youtube.com/watch?v=KC5Bo6qc3AY>

Funding opportunities in interdisciplinary methods



LIFT Short Term Scientific Mission (STSM)

“Are you an early career researcher (<40 years of age) with a passion for positive animal welfare and a wish to travel to an experienced institute? Or are you looking for some help with a project link to positive animal welfare? Then read further!”

Small grants up to 2,100 Euro to support exchange stays at host institutions in other countries



STSM Awardees

STSM on lying behaviour in horses

Emanuela Dalla Costa, from the University of Milan, Department of Veterinary Medicine and Animal Sciences in Italy, visited...

[Read More](#)



STSM Awardees

Biosecurity and fish welfare in Serbia

In October 2023, Stojmir Stojanovski from North Macedonia visited the University of Novi Sad in Serbia on a...

[Read More](#)

Using interdisciplinary perspectives to get funding



- The EU is on your side!

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<https://research-and-innovation.ec.europa.eu/funding/>

WEAVE LEAD AGENCY PROCESS

<https://www.dfg.de/en/research-funding/funding-opportunities/>

COST ACTIONS- e.g. LIFT- Can join at any time!

<https://www.cost.eu/>

Be ready for rejections- and use them to make your project stronger! *Many grant agencies allow resubmissions*

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Methods: The power of multi-lab approaches



ManyPrimates

ESTABLISHING A CULTURE OF COLLABORATION IN PRIMATE COGNITION RESEARCH

The ManyPrimates project was initiated to facilitate collaboration across study sites in primate cognition research. By joining forces, we hope to address important outstanding questions that individual labs could not answer by themselves. These include:

- How reliable are effects in primate cognition research?
- How do cognitive abilities map onto phylogeny?
- How do environmental variables influence cognition?
- How are individual differences in performance structured across tasks and species?

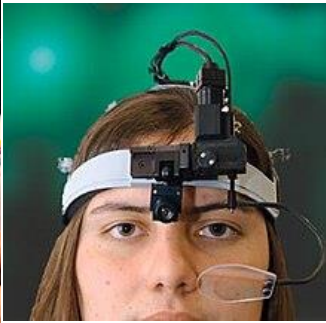
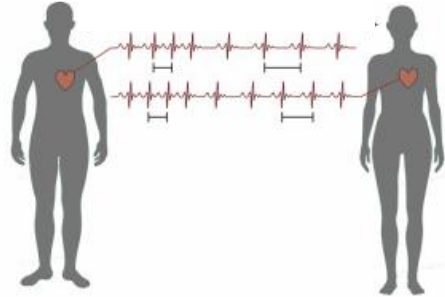


- Increase internal and external validity
- Establish SOPs and promote gold standards
- Explore meaningful variation across groups, populations, breeds, environments, etc...

Methods: Interdisciplinary research approaches



<https://peplab.web.unc.edu/>

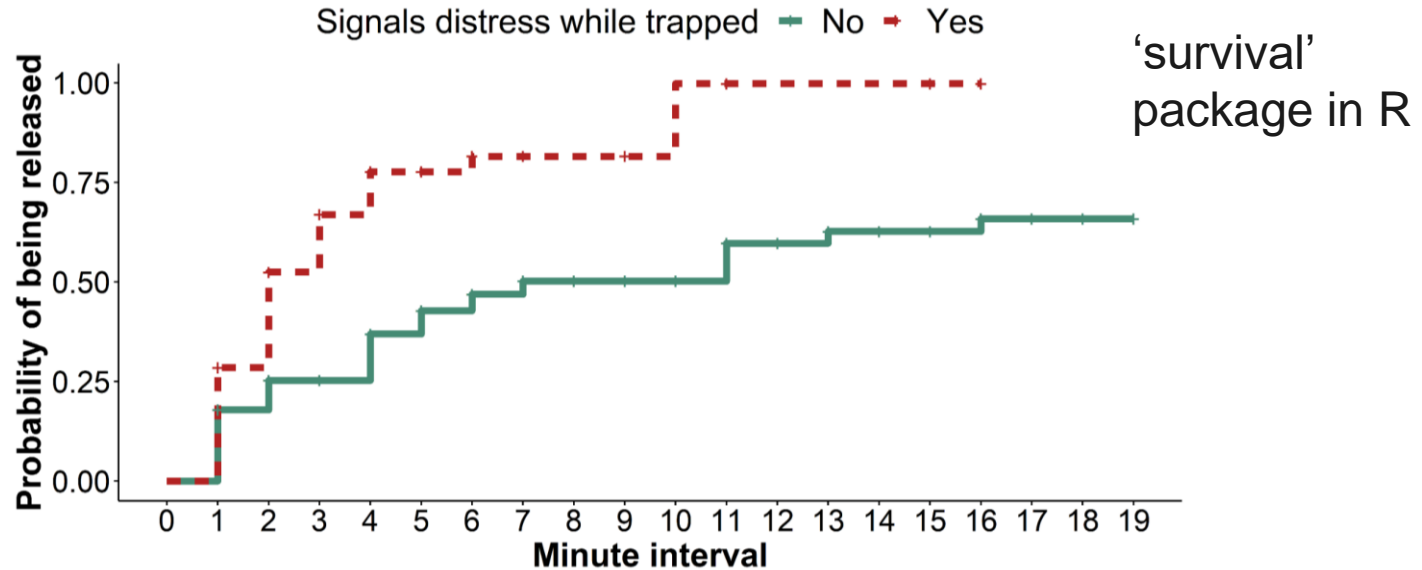


A. Krause, FBN



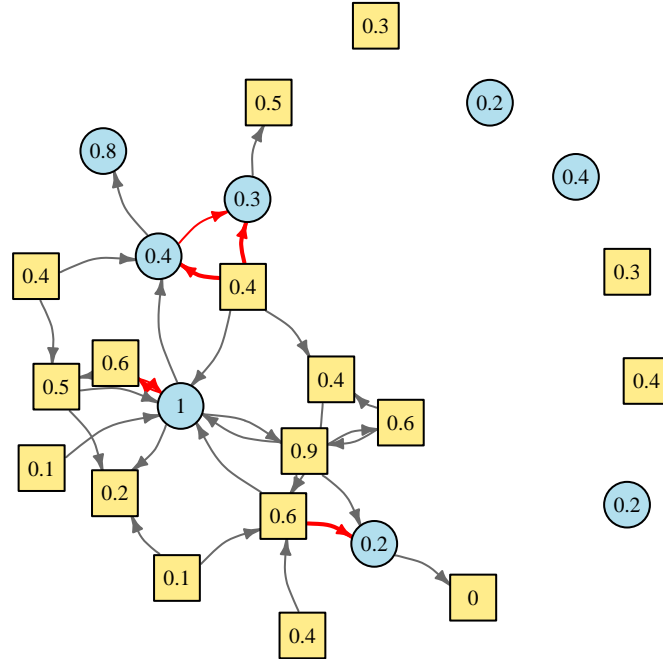
<https://www.connellylab.com/>

Methods: Interdisciplinary tools for analyses



Survival analyses- Combining data on latency and likelihood into an overall probability- Hazard ratio

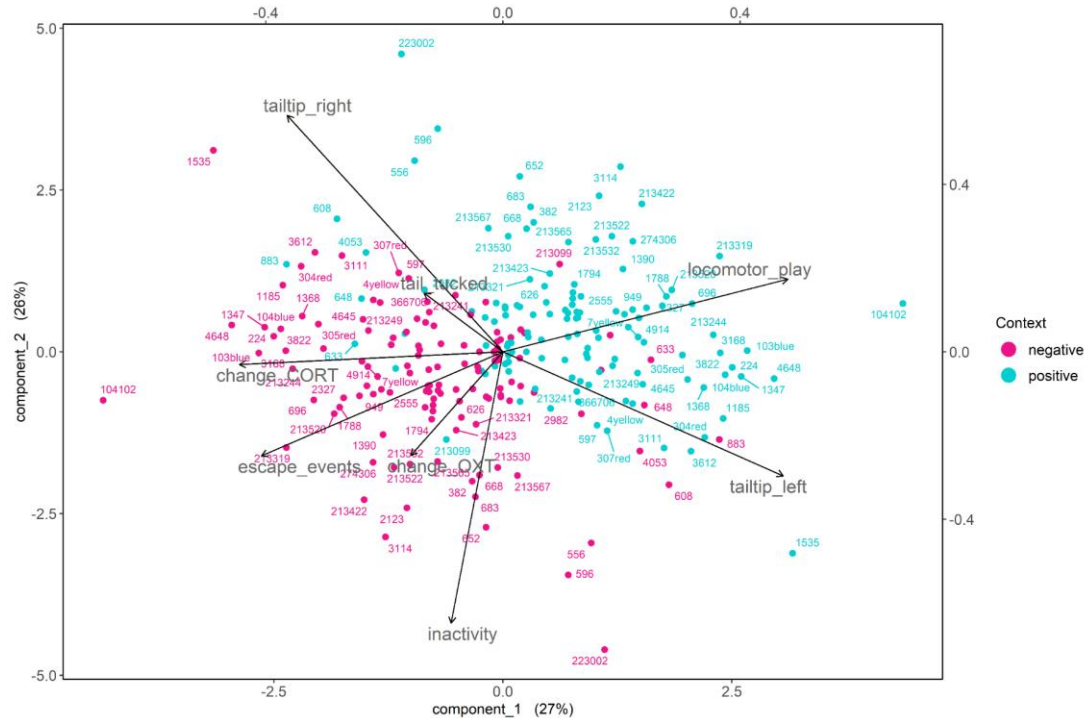
Methods: Interdisciplinary tools for analyses



'igraph' and
'Ergm' packages
in R

Social Network Analyses (SNA)- Investigates how relationships influence social structure, and how social structure influences individuals

Methods: Interdisciplinary tools for analyses



'mixOmics'
package in R

Principle Component Analyses (PCA)- Which variables best explain variance in data

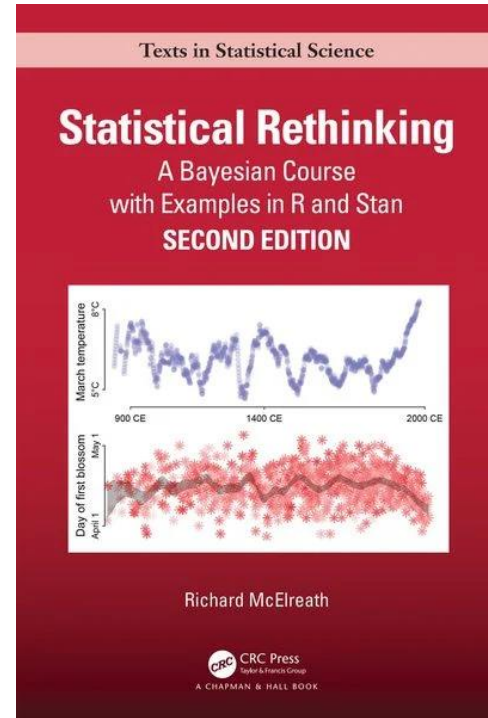
Analysis: Become your favorite statistician



- Easystats: An R Framework for easy statistical modeling, visualization and reporting



<https://github.com/easystats>



https://github.com/rmcelreath/stat_rethinking_2024

Bayesian Inference



<https://easystats.github.io/bayestestR/articles/example1.html>

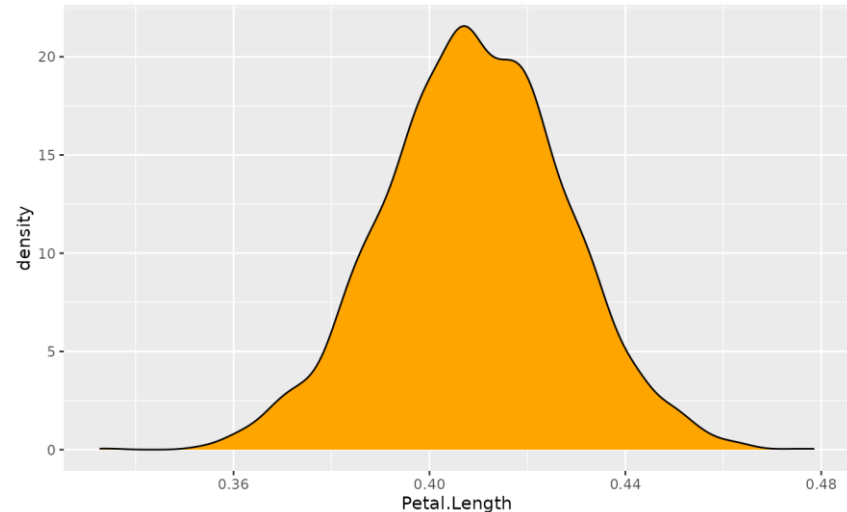


„We don't need *p*-values, *t*-values, or degrees of freedom. Everything we need is contained within this posterior distribution.” Makowski et al. (2019)

Replace this:

```
>
> Call:
> lm(formula = Sepal.Length ~ Petal.Length, data = iris)
>
> Residuals:
>   Min     1Q   Median     3Q      Max
> -1.2468 -0.2966 -0.0152  0.2768  1.0027
>
> Coefficients:
>             Estimate Std. Error t value Pr(>|t|)
> (Intercept)   4.3066     0.0784   54.9 <2e-16 ***
> Petal.Length   0.4089     0.0189   21.6 <2e-16 ***
> ---
> Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
>
> Residual standard error: 0.41 on 148 degrees of freedom
> Multiple R-squared:  0.76,    Adjusted R-squared:  0.758
> F-statistic: 469 on 1 and 148 DF,  p-value: <2e-16
```

With this:



- Point-estimate (Median or peak)
- Credible Interval (Range of most probable values)

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Writing and Dissemination

- **Publish broadly!** In general life sciences journals as well as more specific journals in your field
- **Attend and present broadly!** Conferences are great for making interdisciplinary connections
- **Talk with stakeholders** to develop transdisciplinary links
 - Changing perceptions
 - Influencing policy



**Caring about others:
Evidence for empathy in
animals**

Symposium organized by:
Liza R. Moscovice and Jean-
Loup Rault

Conclusions



- Your research path may not always be straight-forward, *and that's okay* 😊 Seek out and create research opportunities that unite your interests
- The future of science is interdisciplinary; From conceptualization to dissemination, we should be informed by and be informing other disciplines
- The future of science is collaborative- Multi-lab approaches will lead to new discoveries
- Empower yourself to gain knowledge in a range of methods and statistical approaches
- Communicate about the (potential) broader impacts of your research

Resources in Interdisciplinary Life Sciences



- Camerlink, 2022. *Bridging Research Disciplines to Advance Animal Welfare Science: A practical guide*. CABI.
- Beaulieu 2024. Capturing wild animal welfare: a physiological perspective. *Biological Reviews* 99, 1-22.
- O'Brien, Wilson & Hawley 2009. “Evolution for everyone: A course that expands evolutionary theory beyond the biological sciences”. *Evo Edu Outreach* 2, 445–457.
<https://doi.org/10.1007/s12052-009-0161-0>
- <https://smcclatchy.github.io/introductory-statistics-with-r/01-introduction/index.html>



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FOR FARM ANIMAL BIOLOGY**

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Forschungsgemeinschaft

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Established 1926



Dummerstorf

Research Institute for Farm Animal Biology (FBN)

Wilhelm-Stahl-Allee 2
18196 Dummerstorf, Germany
www.fbn-dummerstorf.de

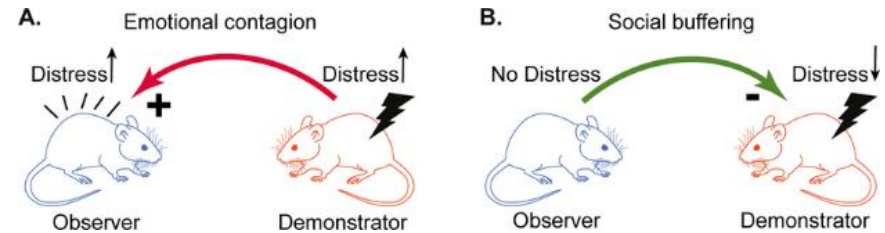
Contact

Name Liza R. Moscovice, PhD
Phone: +49 38208 68 820
Fax: +49 38208 68 208
E-Mail: moscovice@fbn-dummerstorf.de

Using interdisciplinary perspectives to get funding!



- **Applied value:** How your research can help address bigger problems!
- In humans- Clinical implications for treating neuropsychiatric disorders associated with social deficits
- In animals- Welfare implications by identifying factors that influence the spread of positive or negative emotions within animal groups



Hann et al. 2019