

Psychological Science

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## Placebo Analgesia Reduces Costly Prosocial Helping to Lower Another Person's Pain

[Helena Hartmann](#) , [Paul A. G. Forbes](#) , [...], and [Claus Lamm](#)

[Volume 33, Issue 11](#)

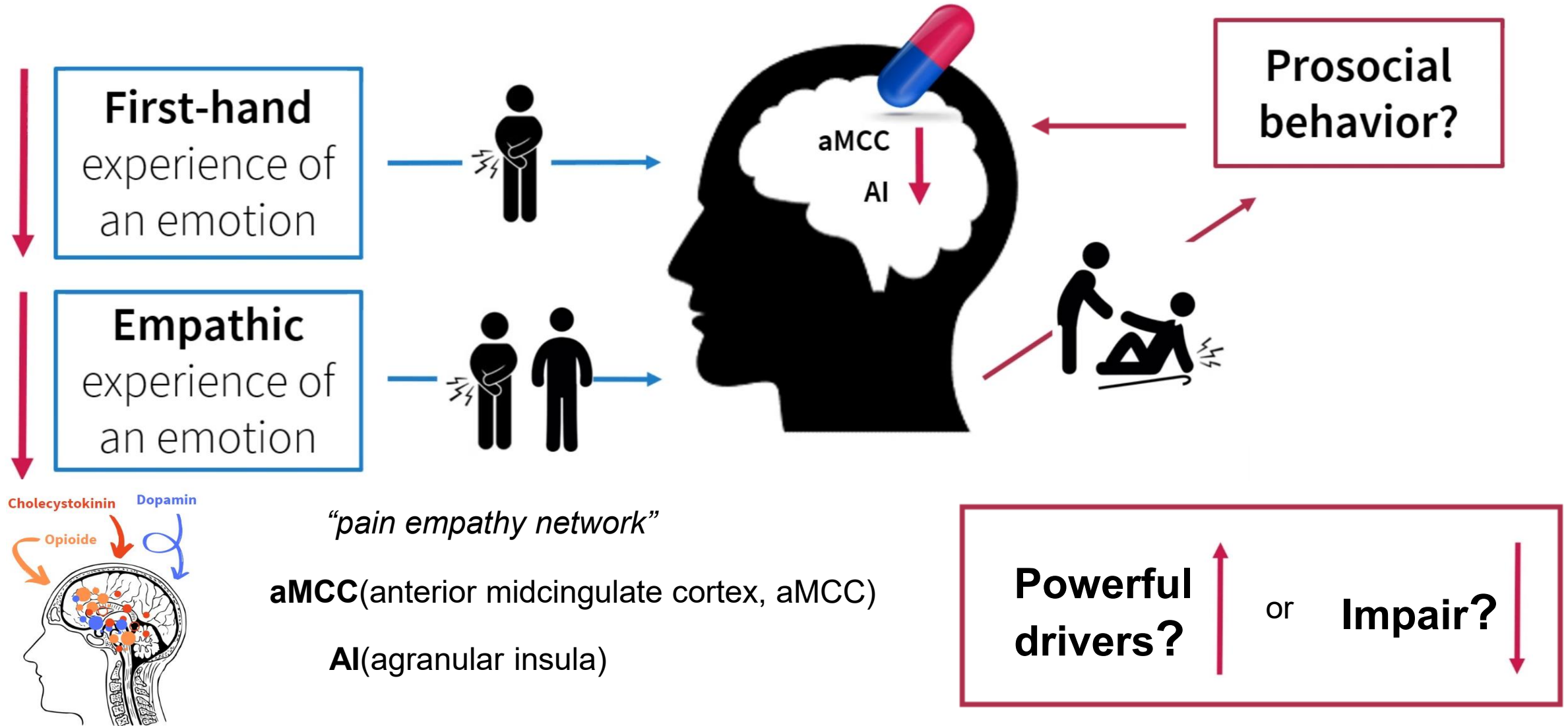
*interested in factors that influence how we  
perceive pain in ourselves and in other people*

Yang Ziyang

2024.02.01

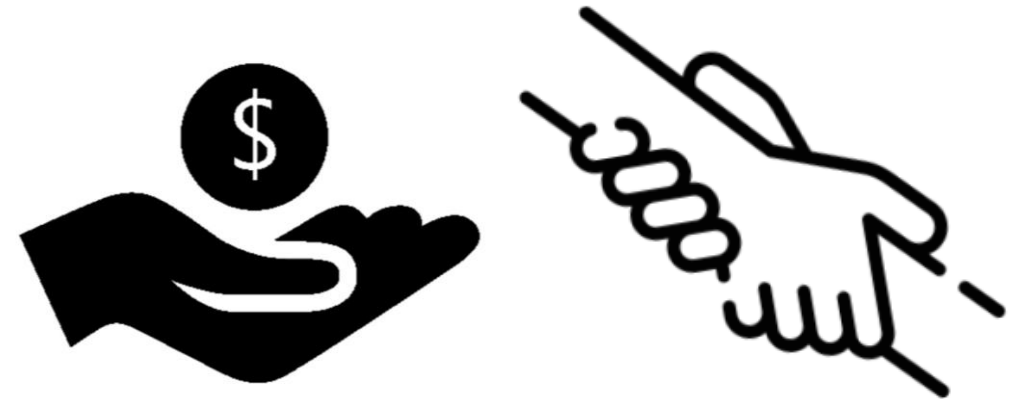
# Introduction

## First-hand vs. empathic emotional experiences



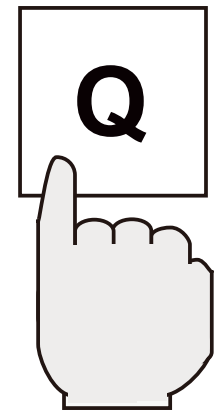
## Prosocial behavior

- Voluntary behavior that **benefits another** but involves **sacrificing personal benefits**
- Mostly **correlational** studies and **dispositional** measures
- **Effort** behavior as a better proxy?



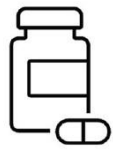
FINANCIAL

MORAL

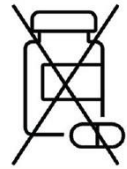


EFFORT

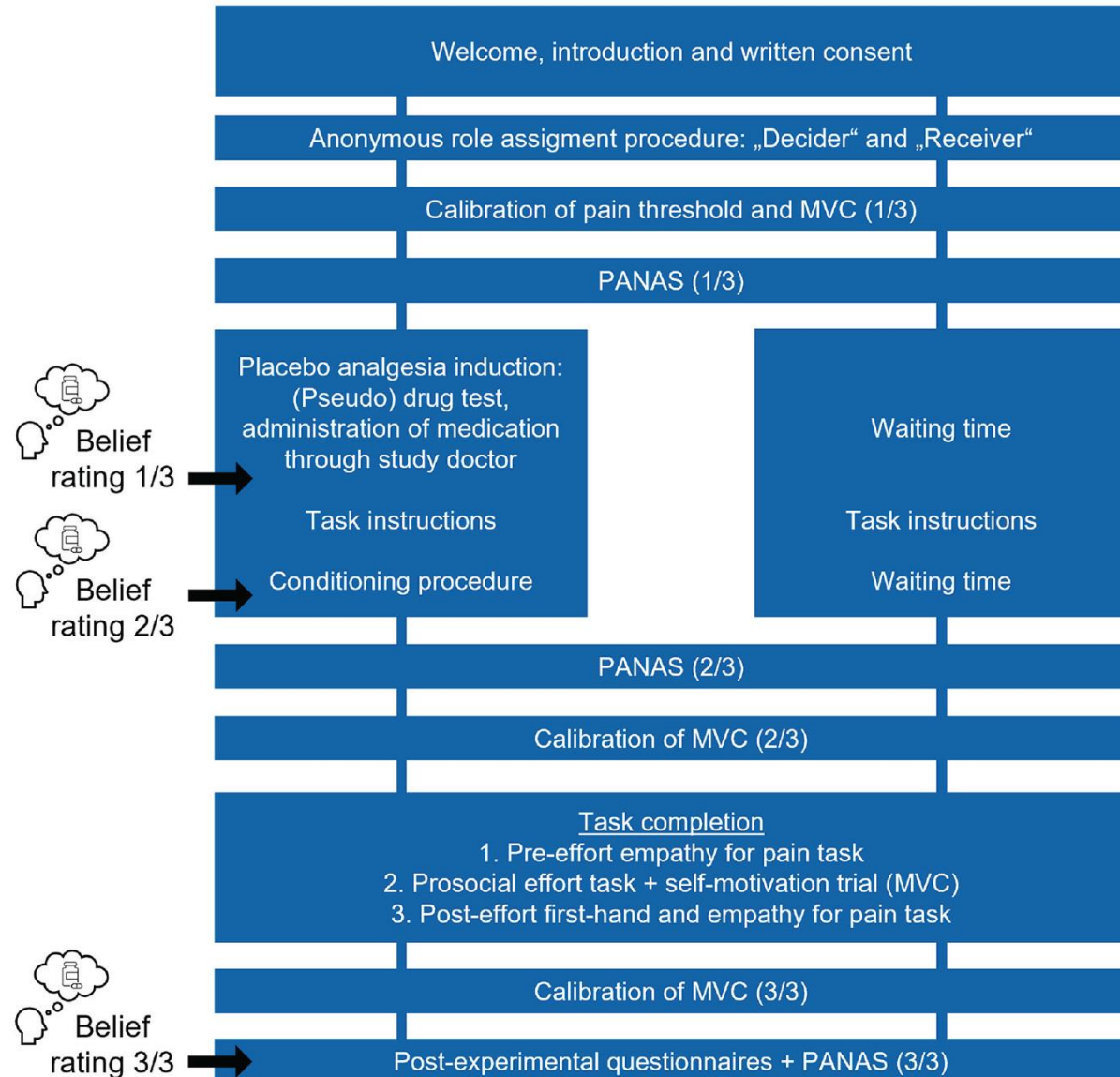
# Design



Placebo group

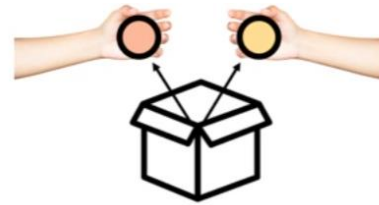


Control group



## Exclusion criteria

- Beck's Depression Inventory II
- Autism Quotient
- Toronto Alexithymia Scale



**Role assignment:**  
„Decider“ &  
„Receiver“  
of pain



**MVC2**

PANAS2



Placebo group



Control group

PANAS1



**MVC1**



**Pain threshold**



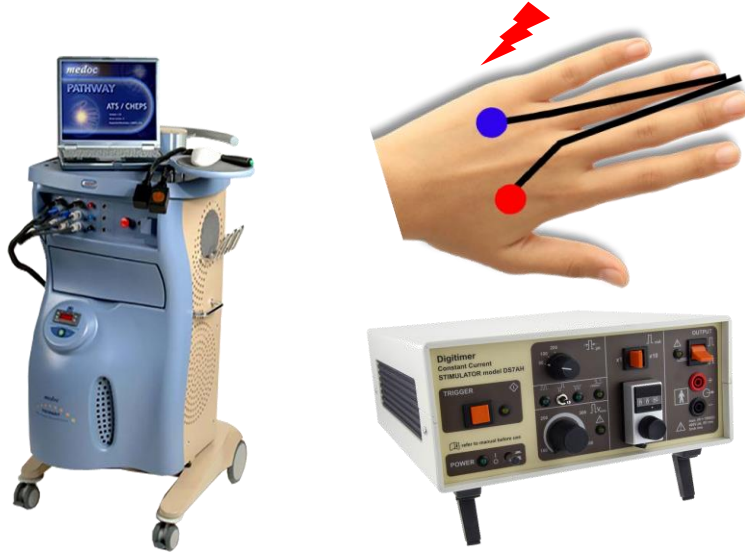
PANAS3



**MVC3**

- IRI
- HAS
- AMI
- SVO
- SD3
- **NASA**

## Pain threshold

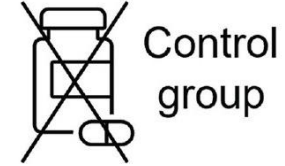


- gain average stimulation intensities between 0 (not perceivable) ,4 (medium painful) and 8 (extremely painful)
- amplify the placebo effect

## Placebo analgesia induction



Placebo  
group



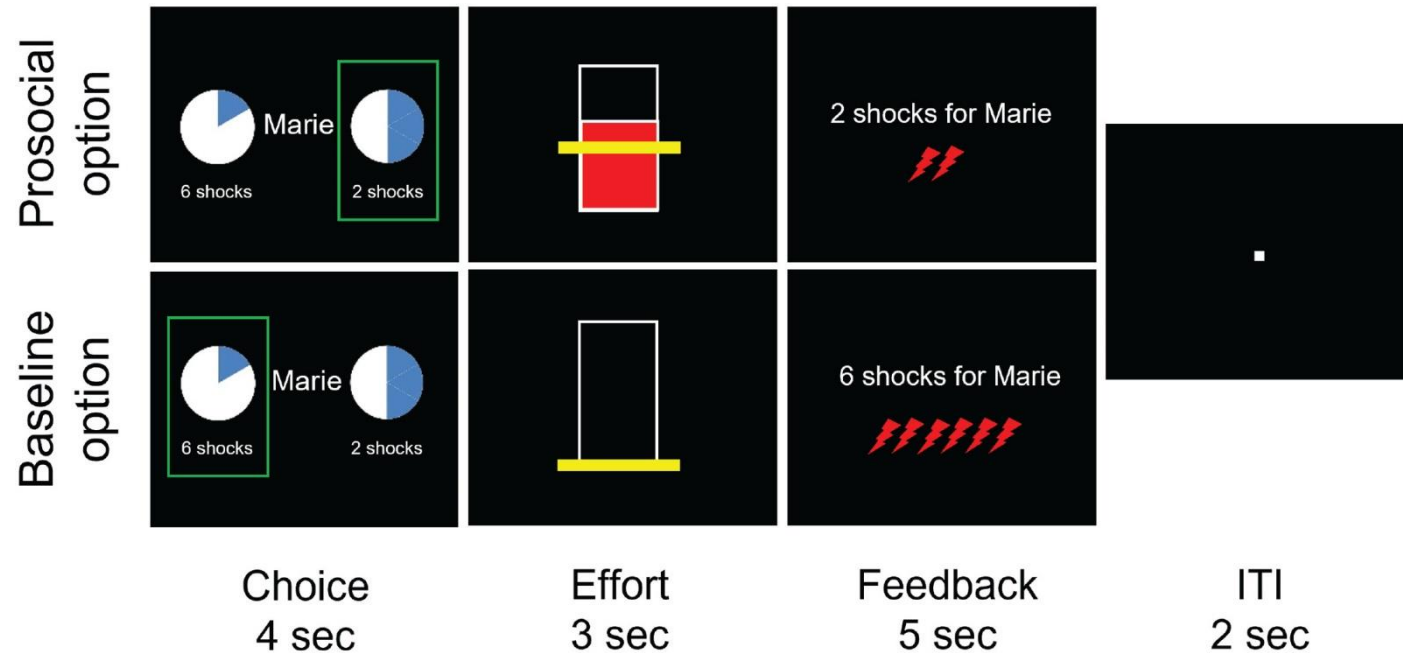
Control  
group



- three belief ratings



## Prosocial effort task

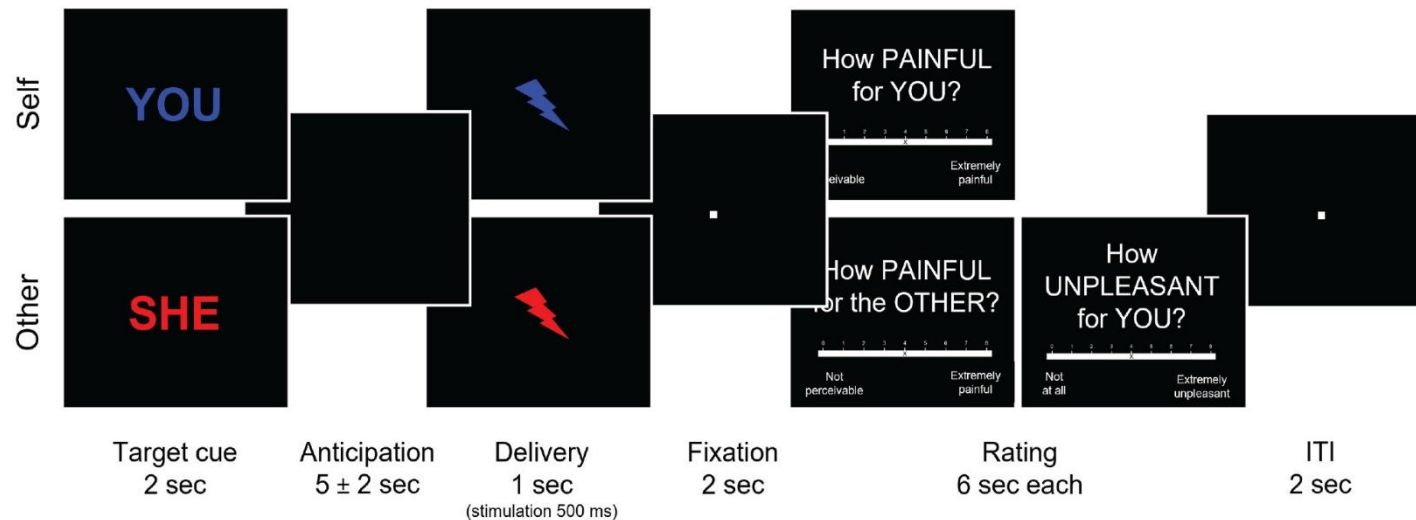


5 effort levels (30, 40, 50, 60 or 70% of MVC) x  
5 shock levels (1, 2, 3, 4 or 5 shocks to other) x  
3 blocks = 75 trials

- other participant would receive shocks they had rated as very painful
- not respond within 3 s, the confederate received 10 shocks

*\*chose to help but failed to reach the chosen effort level, or when they did not respond within 3 s, the confederate received 10 shocks*

## Firsthand-pain and empathy-for-pain task



2 targets (self, other) x  
2 intensities (pain, no pain) x  
5 trials per condition = 20 trials

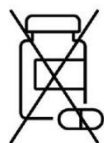
Participants completed a short task  
before the prosocial effort task

Full, posteffort firsthand-pain and  
empathy-for-pain task afterward

# Result



Placebo  
group



Control  
group

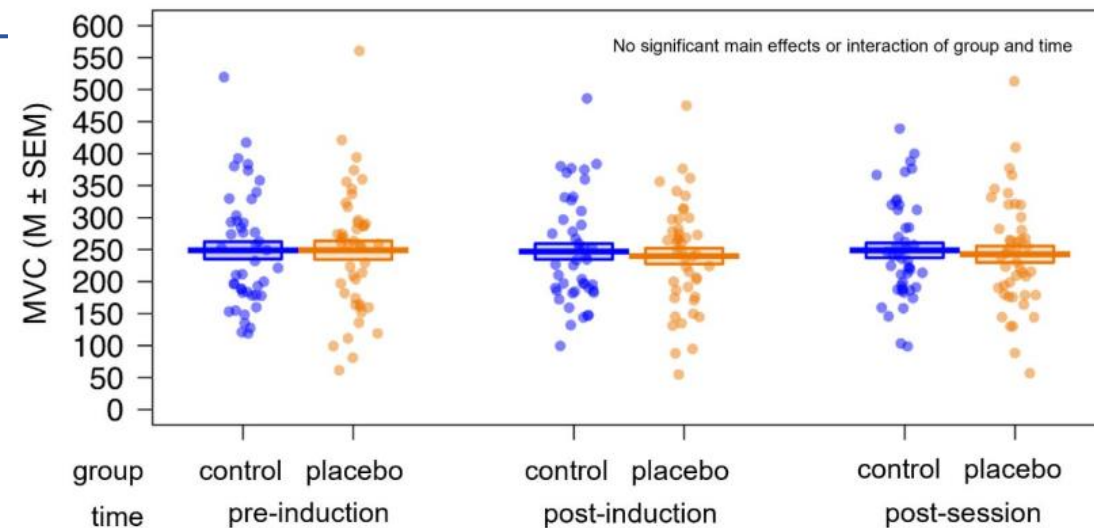
*Sociodemographic characteristics and trait questionnaire scores of the two groups.*

	Placebo group	Control group	<i>t(df)</i>	<i>p</i>
N (male/female)*	45 (21/24)	45 (21/24)	---	---
Age*	23.56 ± 2.90	24.00 ± 4.32	0.57(76.95)	.569
Empathic concern (IRI)*	18.47 ± 4.81	18.40 ± 4.76	-0.07(87.99)	.948
Perspective taking (IRI)*	18.78 ± 4.79	18.36 ± 3.99	-0.45(85.21)	.651
Prosocial behavior (HAS)*	78.93 ± 8.90	78.82 ± 9.59	-0.06(87.50)	.955
Behavioral activation (AMI)*	2.60 ± 0.59	2.52 ± 0.68	-0.58(86.71)	.566
Social motivation (AMI)*	2.87 ± 0.61	2.66 ± 0.71	-1.46(86.12)	.149
Emotional sensitivity (AMI)*	2.54 ± 0.63	2.61 ± 0.64	0.53(87.96)	.599
Social Value Orientation (SVO)*	Individualists: <i>n</i> = 10	Individualists: <i>n</i> = 7	0.25(87.95)	.803
	Prosocials: <i>n</i> = 35	Prosocials: <i>n</i> = 38		
Psychopathy (SD3)*	18.13 ± 3.89	19.62 ± 5.34	1.51(80.42)	.134
Alexithymia (TAS-20)*	38.09 ± 6.76	39.93 ± 6.87	1.28(87.98)	.203
Autism (AQ-k)*	6.62 ± 3.74	6.60 ± 2.99	-0.03(83.96)	.975
Depression (BDI-II)*	4.24 ± 3.67	4.55 ± 4.07	0.381(87.09)	.704

NO significant group differences



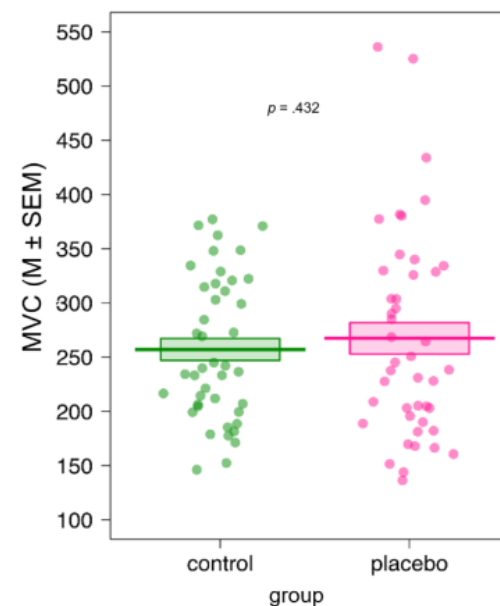
## MVC calibrations over the course of the session



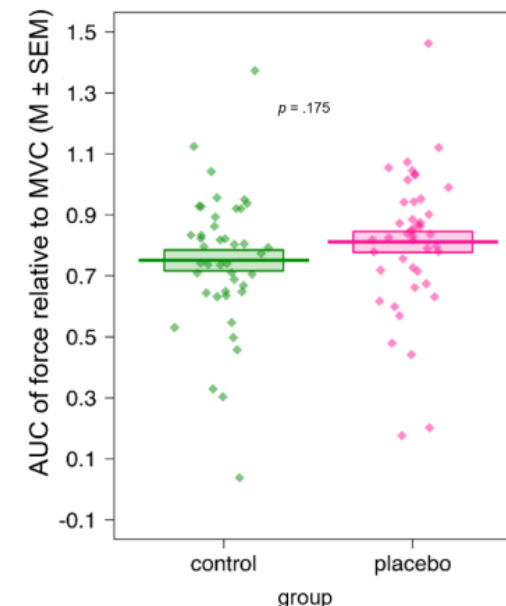
group or time differences in  
participants' general strength



MVC when gaining money for oneself

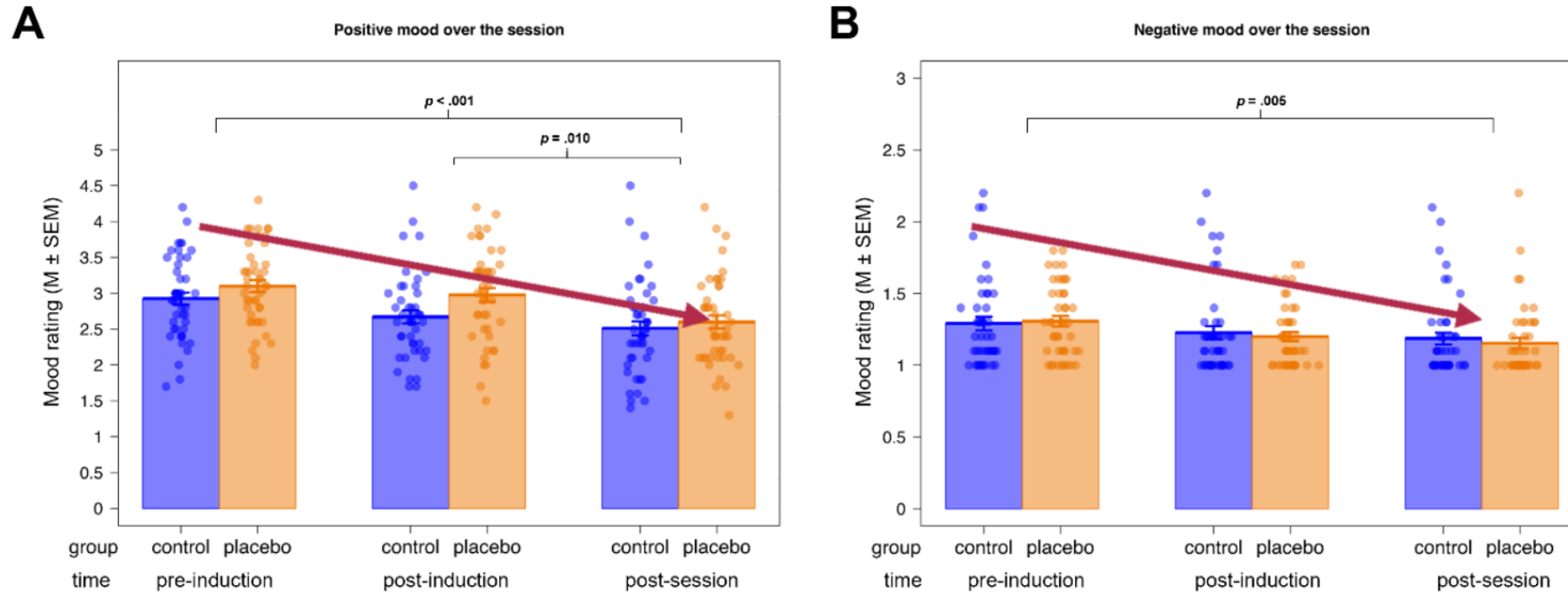


AUC of force during self trial





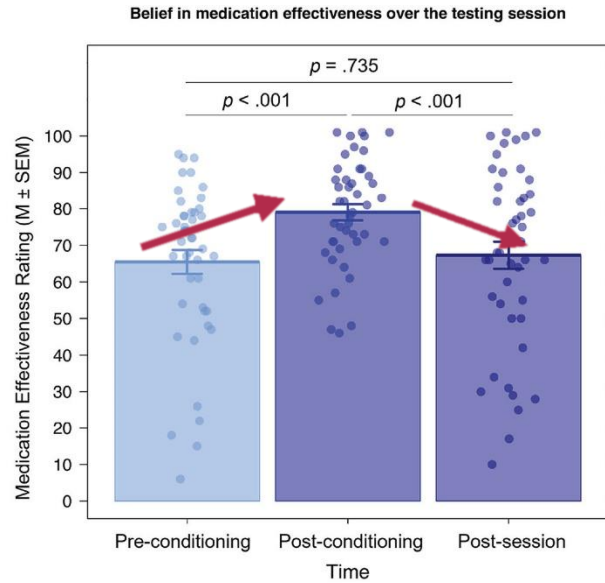
# Result



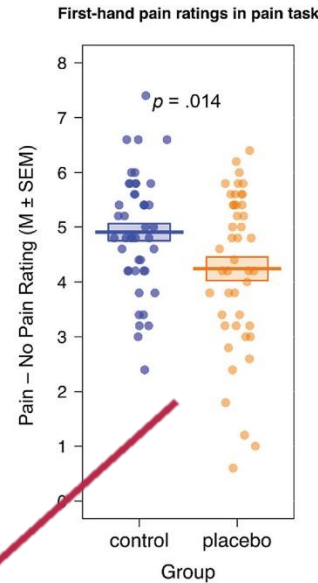
both positive and negative mood decreased significantly over the course of the session

# Result

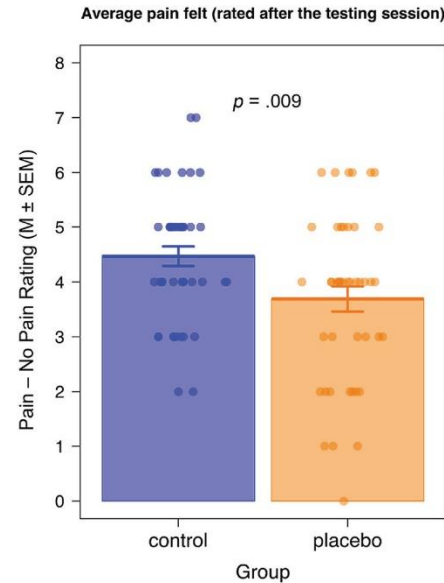
a



b

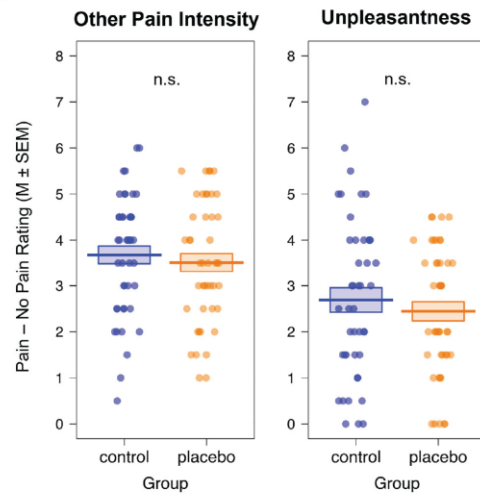


c



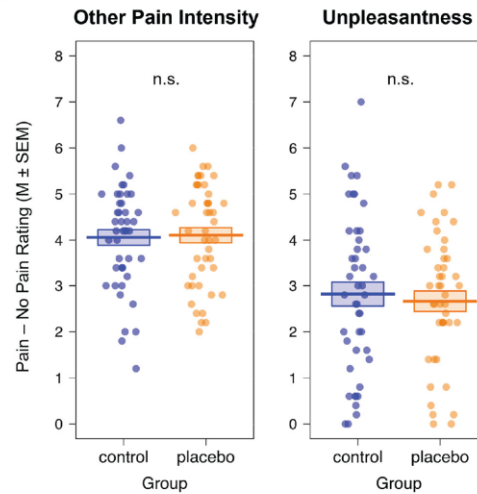
high belief in the medication's effectiveness

a



Pre-effort

b

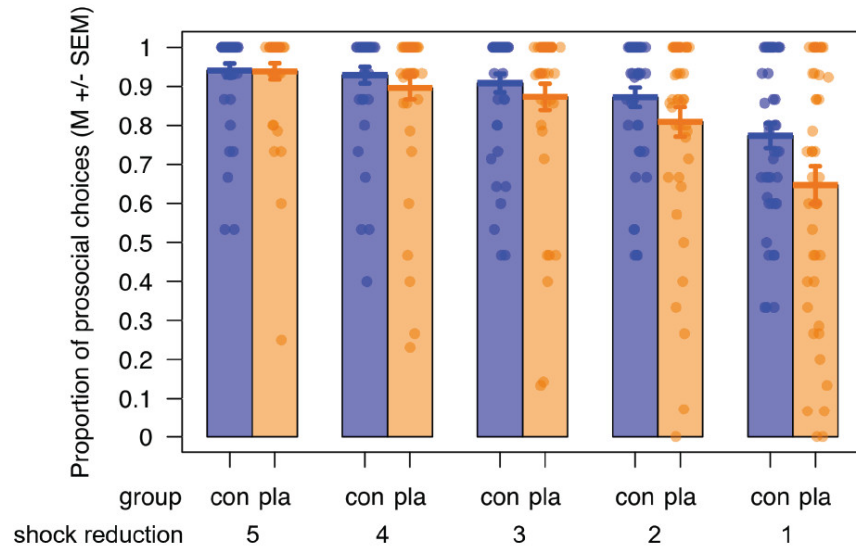


Post-effort

Contrary to previous research and our preregistered hypothesis

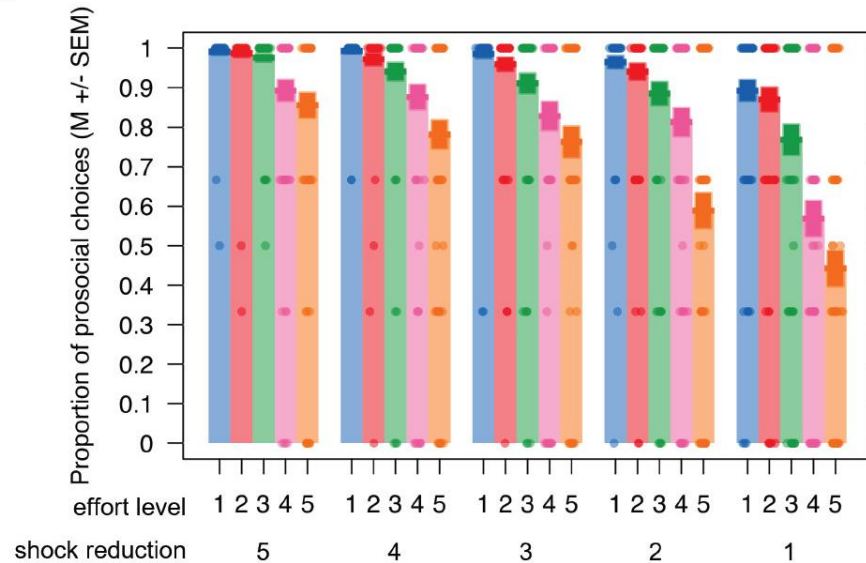
# Result

a



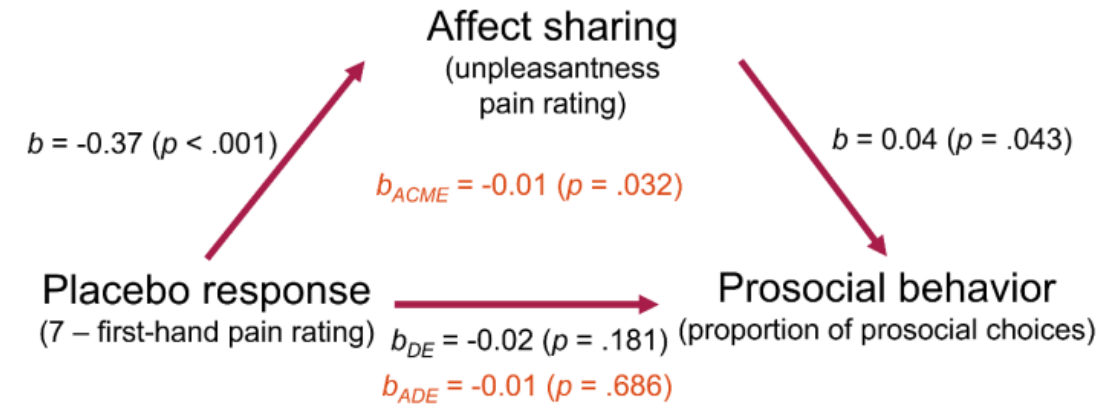
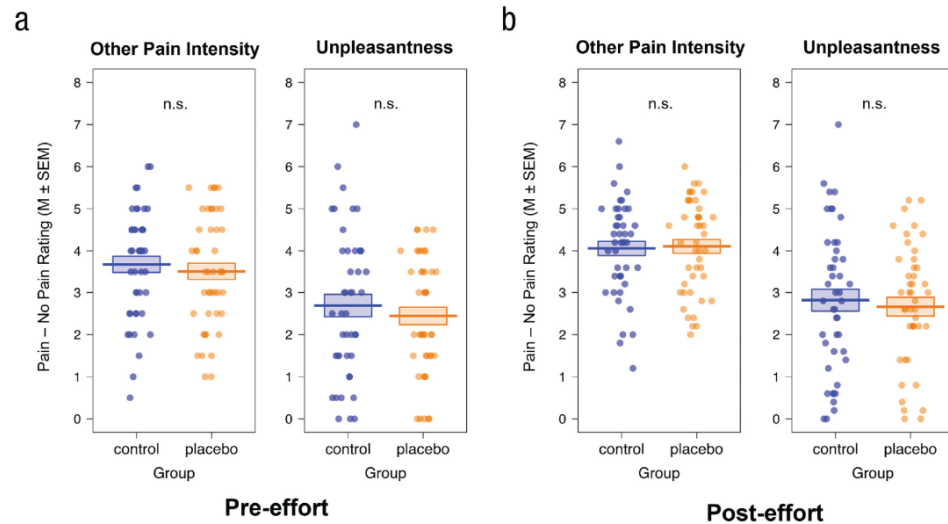
prosocial behavior compared with the control group, dependent on the number of shocks the other would receive but *independent of effort level*

b



proportion of prosocial choices between the five effort levels increased with decreasing possibility to help *independent of group*

# Result



- prosocial was positively associated with higher unpleasantness ratings when observing others in pain
- but not with self- or other-related pain-intensity ratings



the effects of individual differences in placebo analgesia on prosocial choices were fully mediated by the level of affect sharing in response to other people's pain