Neurobiology of Prosocial Behavior: Comforting & Helping

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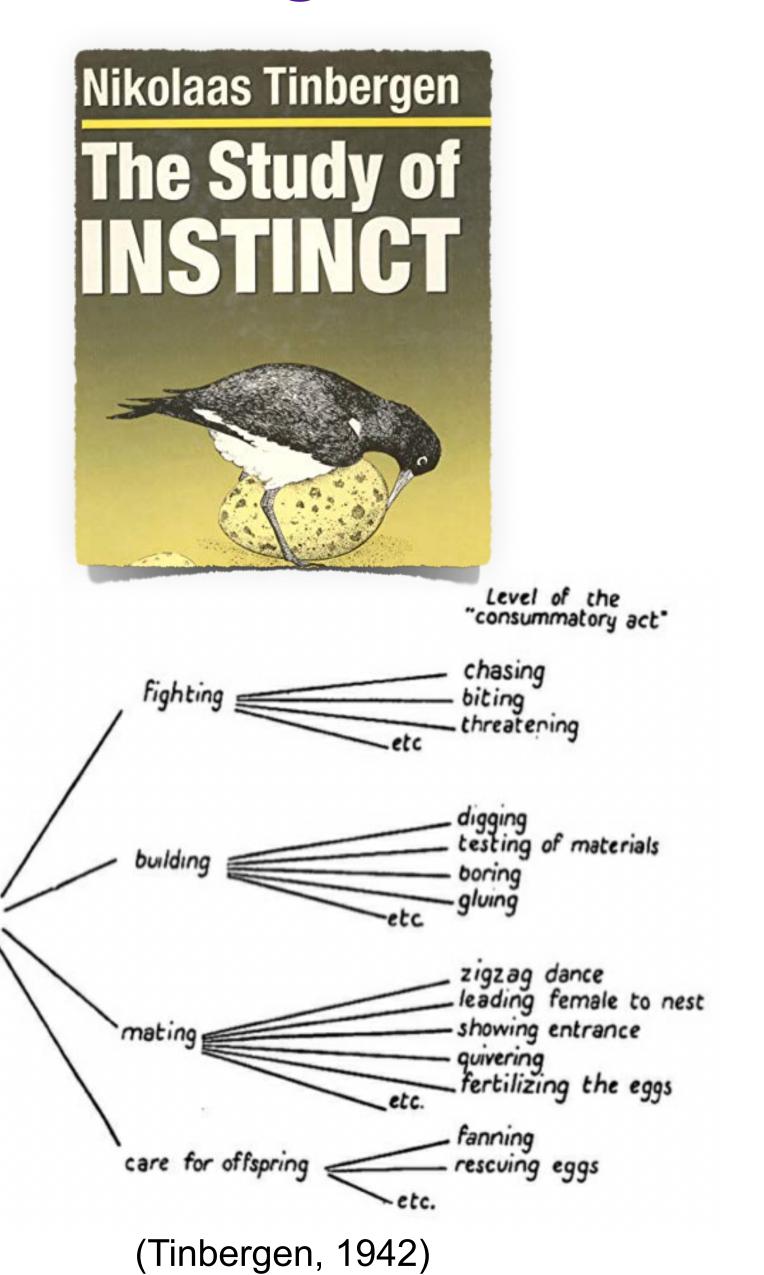






All life forms exist to maximize survival and reproduction

Benefiting oneself

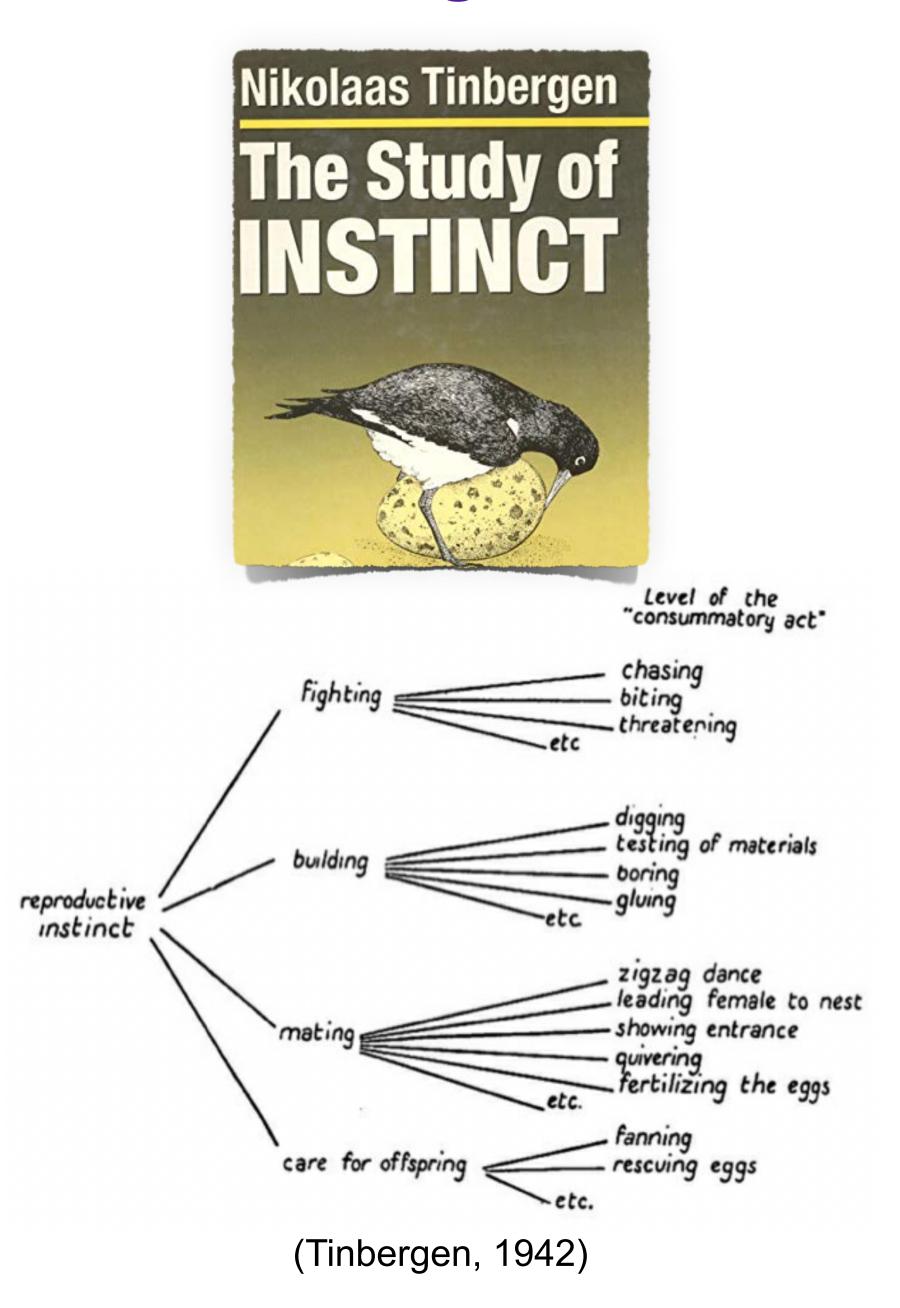


reproductive

instinct



Benefiting oneself



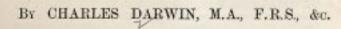
Benefiting others



THE

DESCENT OF MAN,

SELECTION IN RELATION TO SEX.



IN TWO VOLUMES,-Vol. I.

WITH ILLUSTRATIONS.

LONDON: JOHN MURRAY, ALBEMARLE STREET. 1871.

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"There can be no doubt that a tribe including many members who ... were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection."

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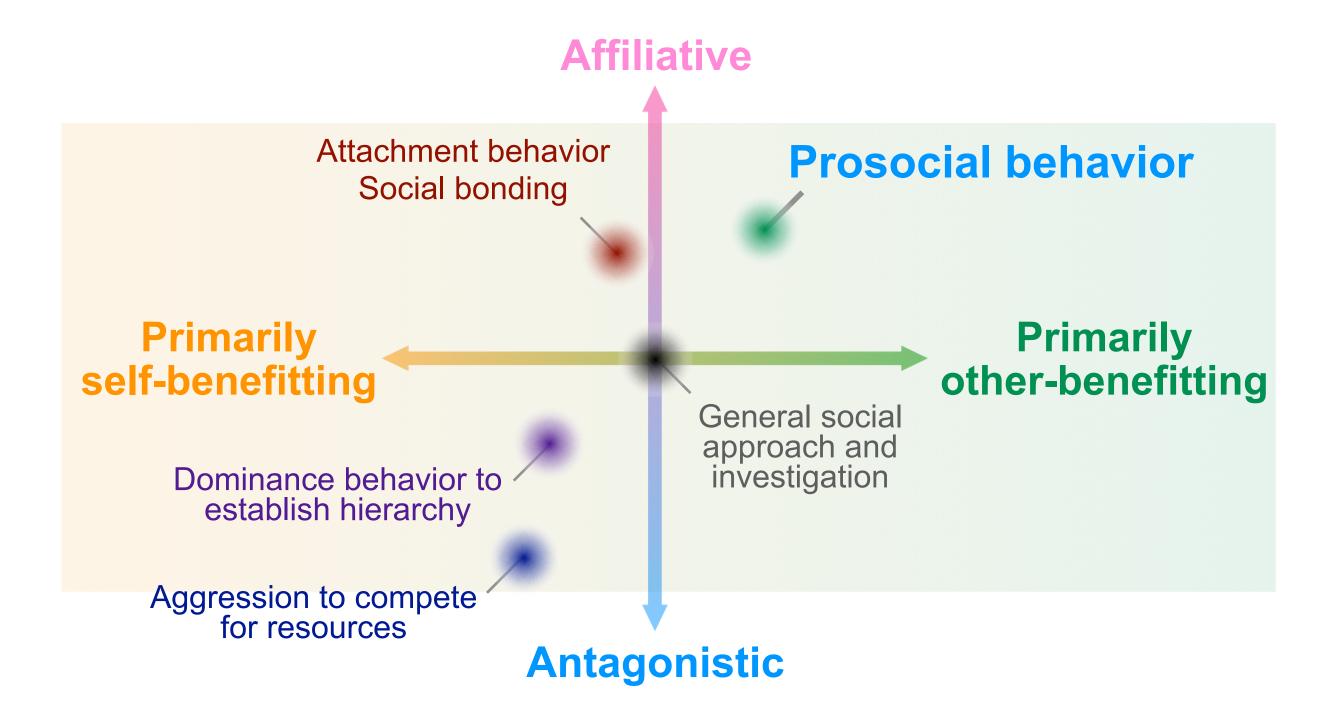
- Why and how do humans and other species behave in ways that benefit others?
- At the level of an individual, what mechanisms motivate these behaviors?

Prosocial behavior — the behaviors that benefit others

- It occurs in response to a distressed state and/or need in another individual
- It helps to alleviate the distress and/or need in the recipient

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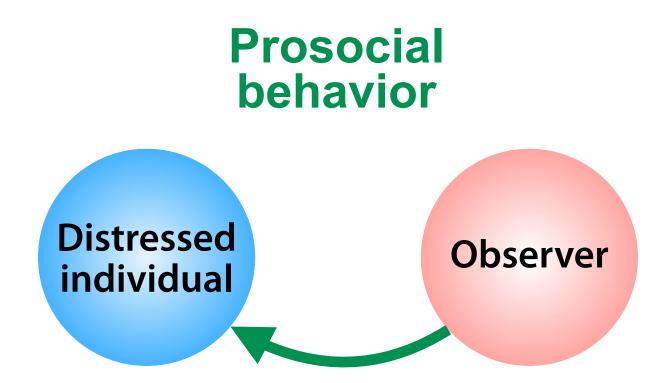
- It is not simply an <u>affiliative behavior</u> (it is not just friendly social behavior)
- It needs to be aimed at benefitting others

Distressed individual Observer

- Feeling other's emotions
- Understanding other's perspectives

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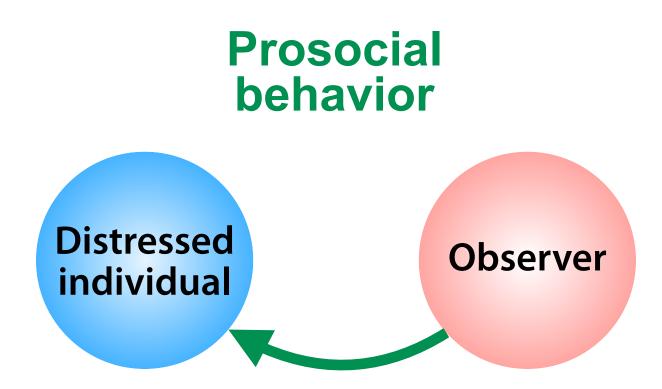


- Taking behavioral actions to
 - Address others' needs
 - Improve others' conditions

Distressed individual Observer

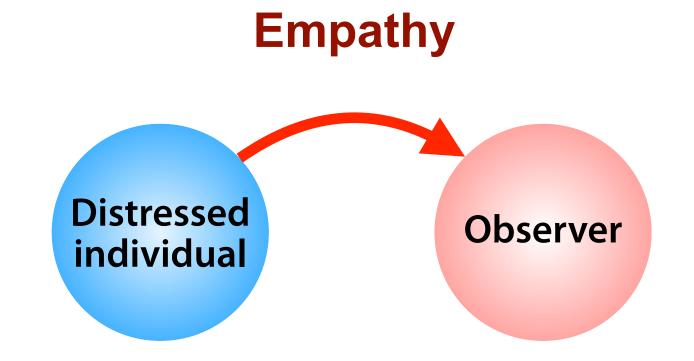
- Feeling other's emotions
- Understanding other's perspectives

I can feel you



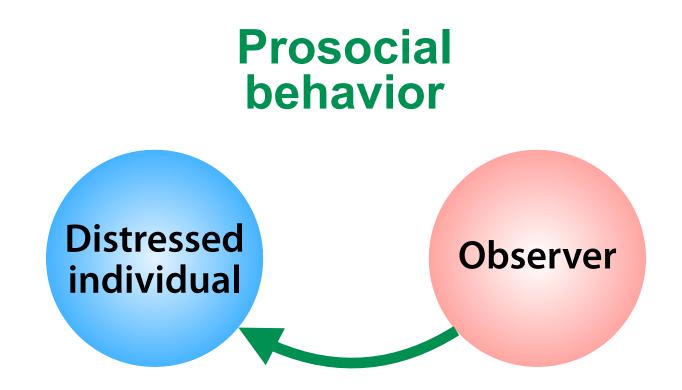
- Taking behavioral actions to
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I can help you



- Feeling other's emotions
- Understanding other's perspectives

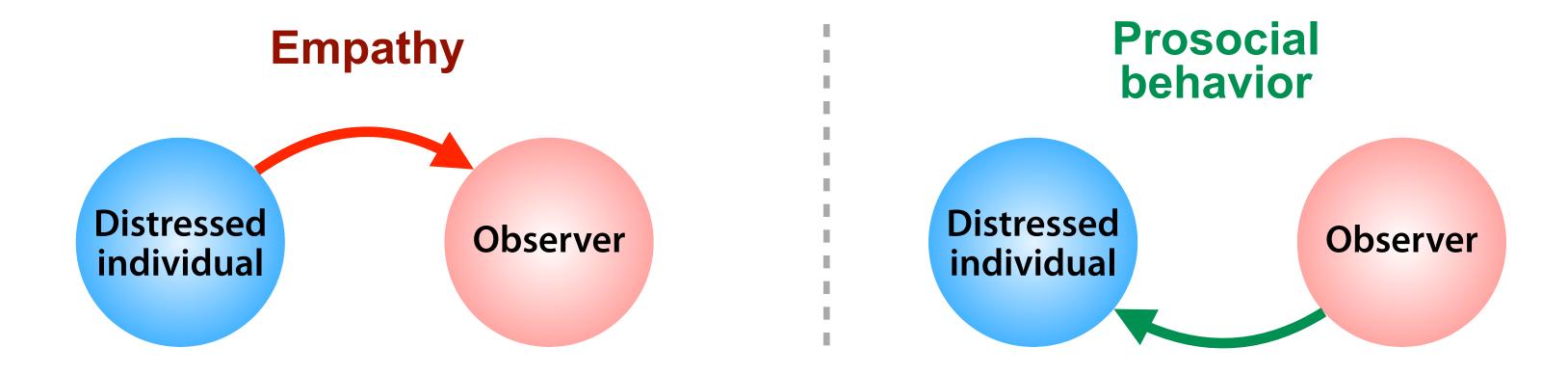
I can feel you



- Taking behavioral actions to
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 - Improve others' conditions

I can help you

- Prosocial behavior an important step beyond feeling and understanding others
- Feeling and understanding others would have limited value to those in need, if observers do not take actions to provide assistance and address the needs



How does an individual perceive the needs of others?

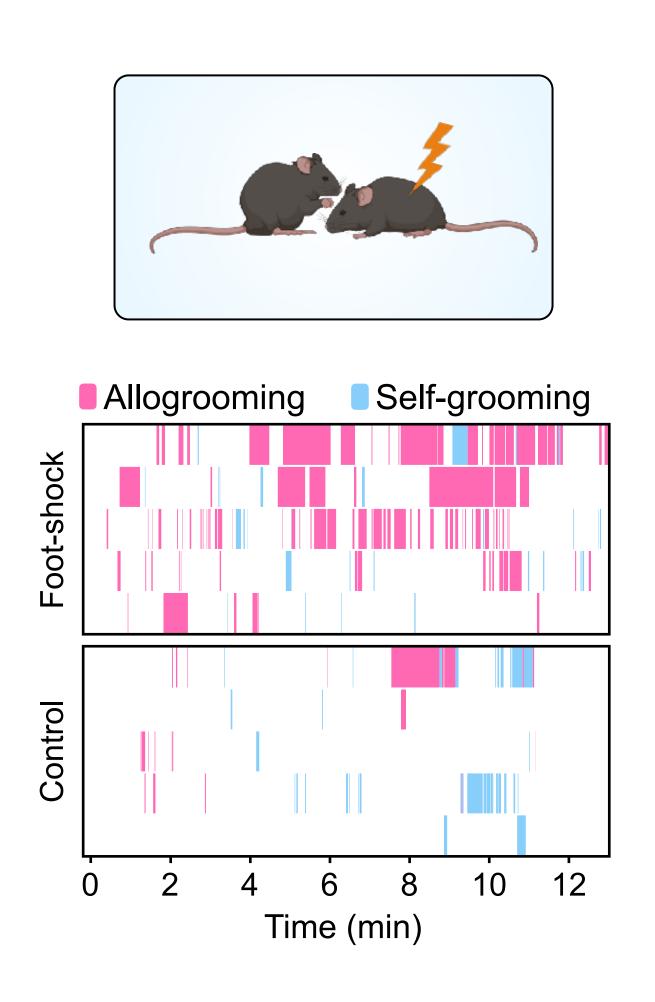
- How does an individual perceive the needs of others?
- Perception → prosocial action to help and benefit others?

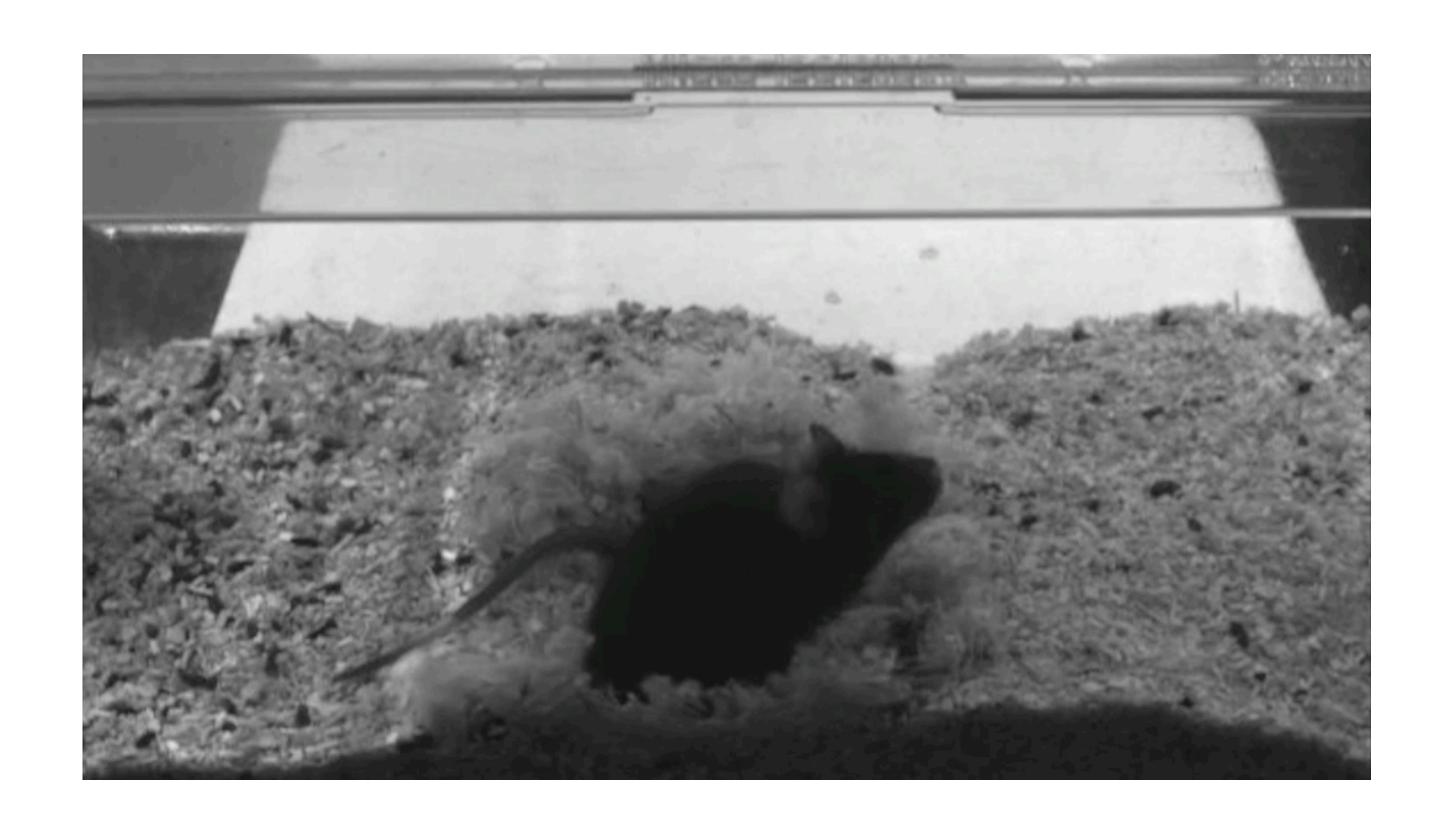
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- How does prosocial behavior benefit the recipients?

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- Perception → prosocial action to help and benefit others?
- How does prosocial behavior benefit the recipients?
- A lack of robust behavioral models in an animal species that
 - (1) displays ethologically relevant prosocial behavior
 - (2) permits an in-depth dissection of the underlying mechanisms

Comforting behavior:

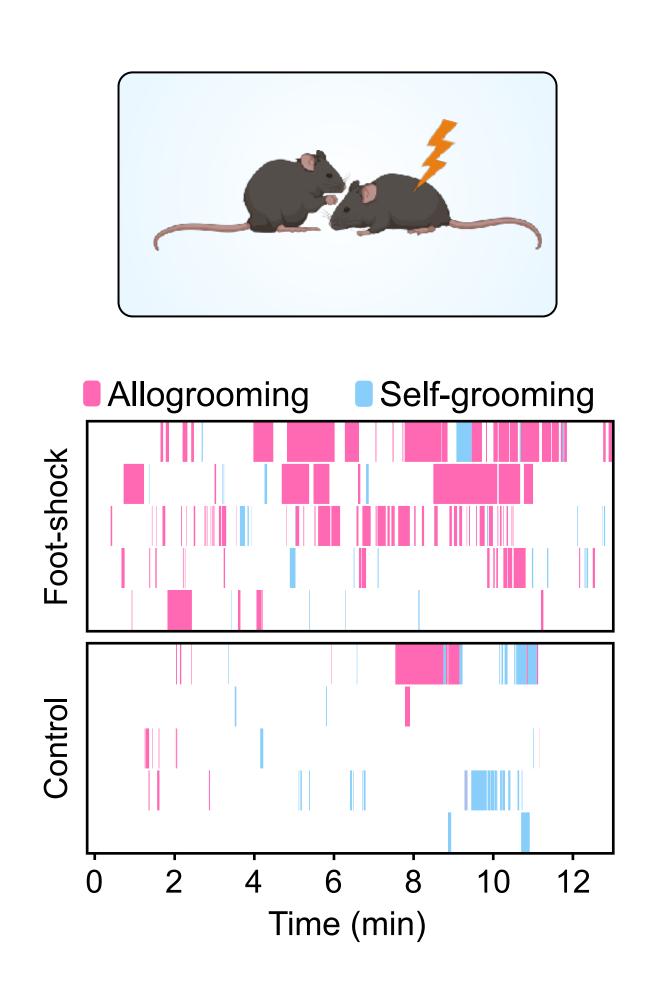
Mice increase social touch (allogrooming) toward stressed mice

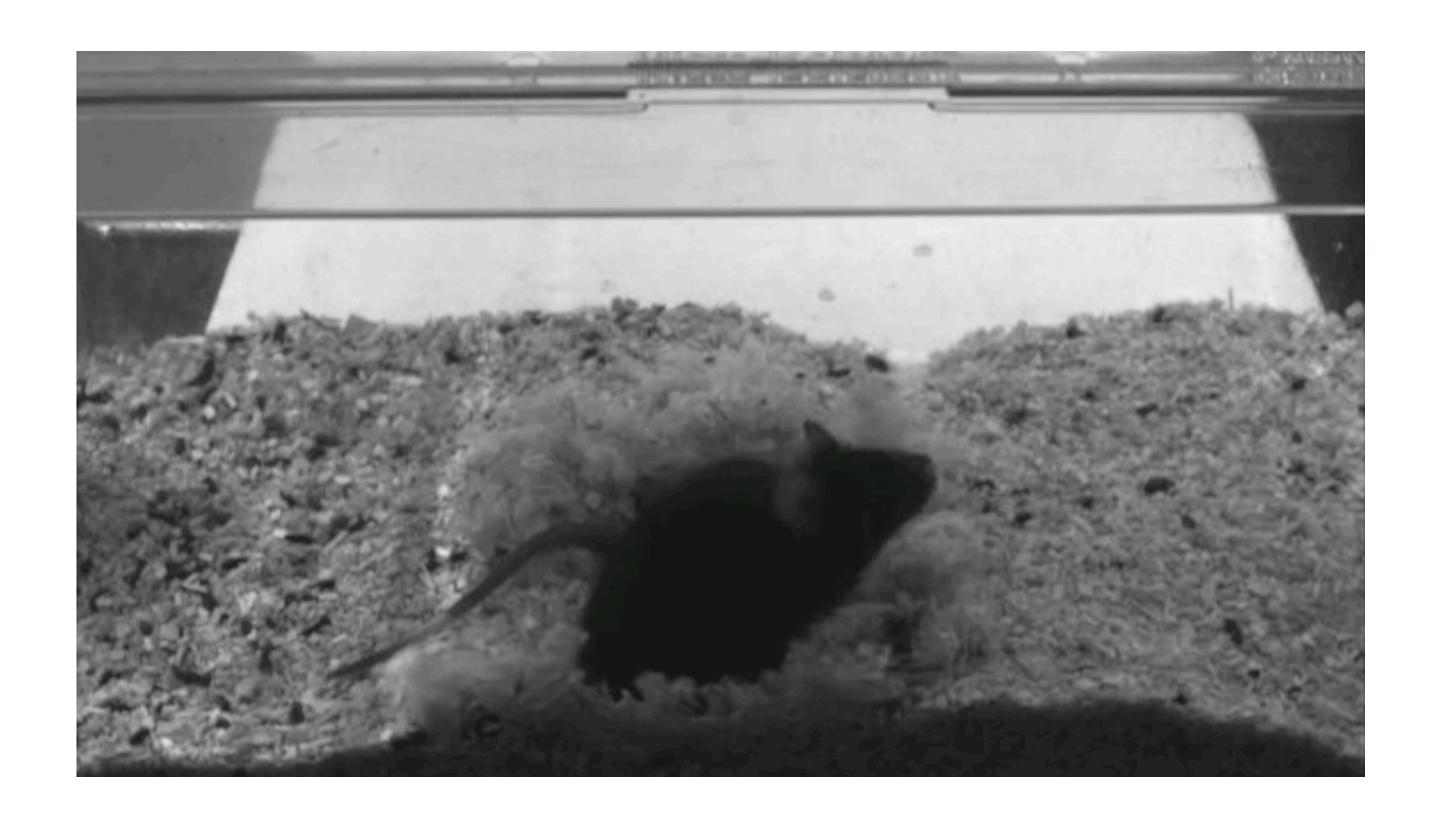




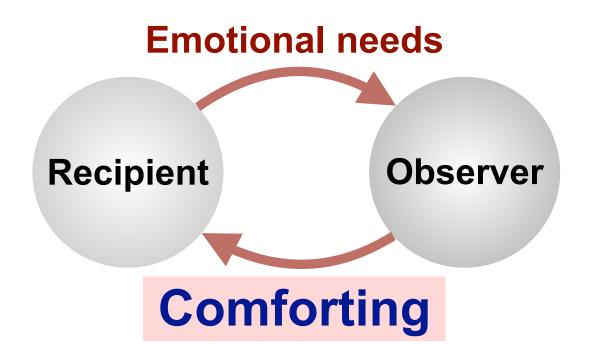
Comforting behavior:

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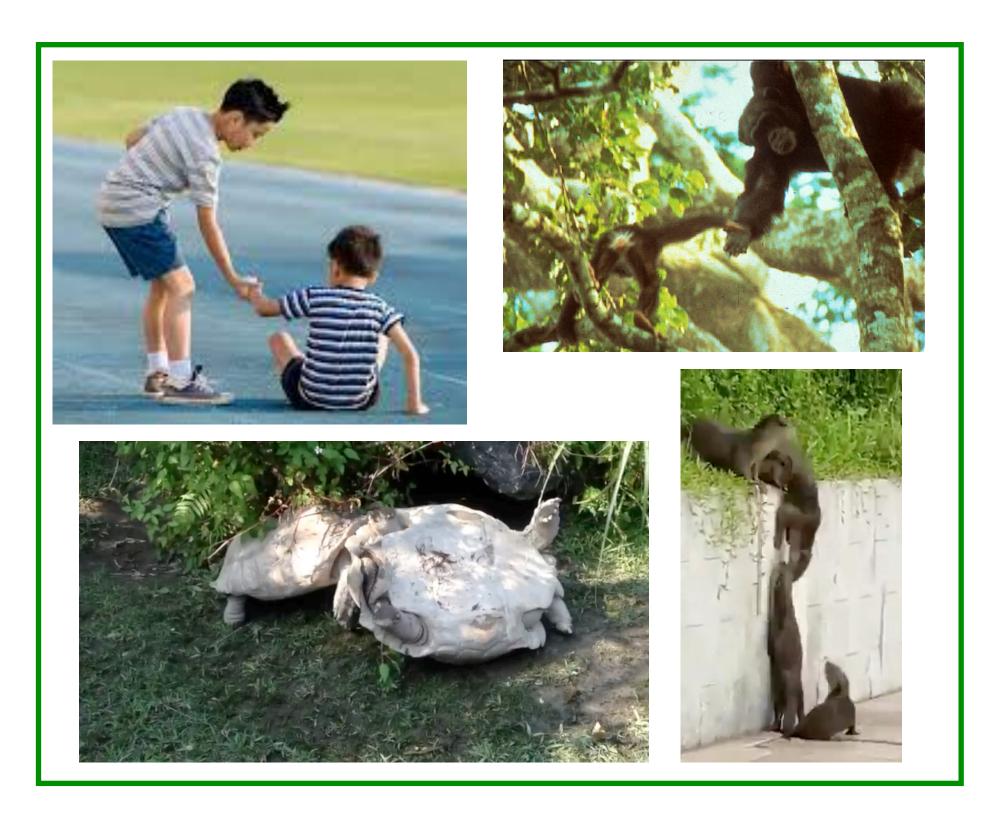


Comforting vs. targeted helping

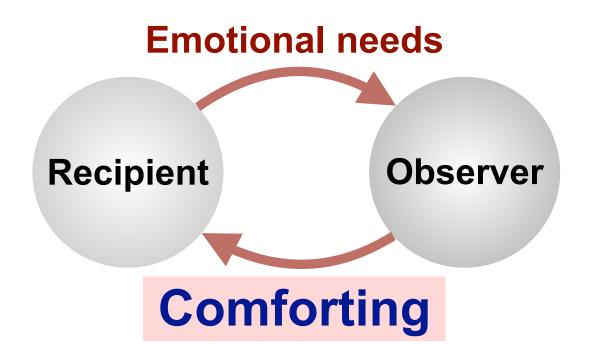






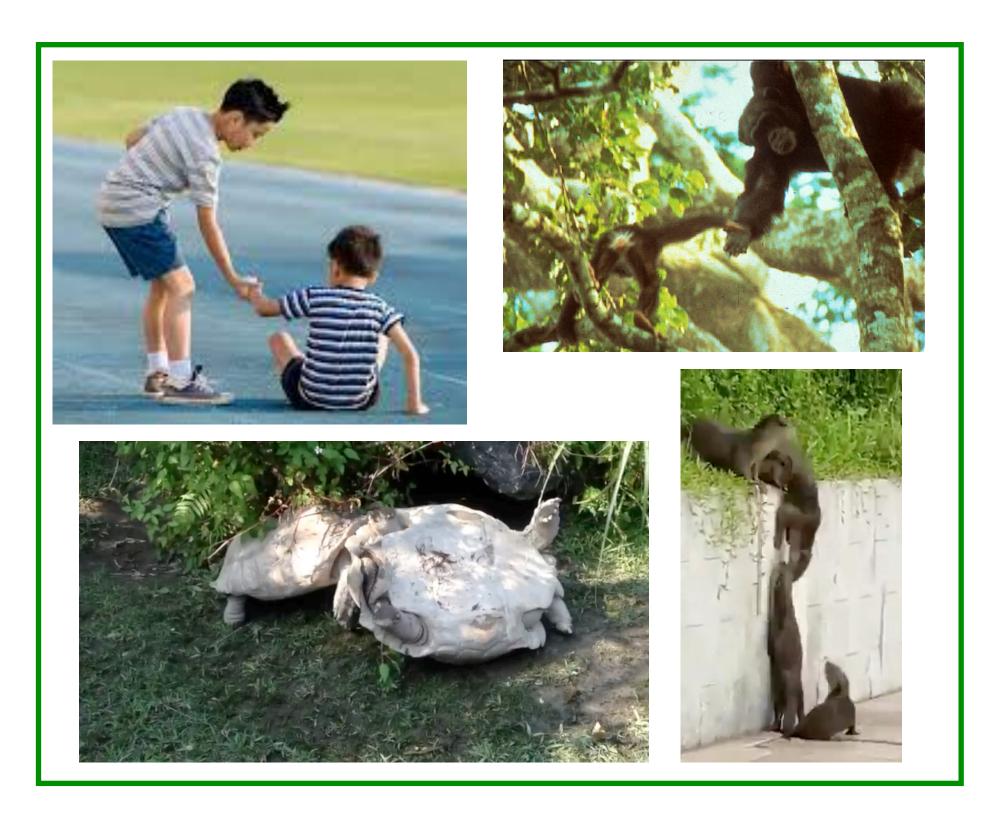


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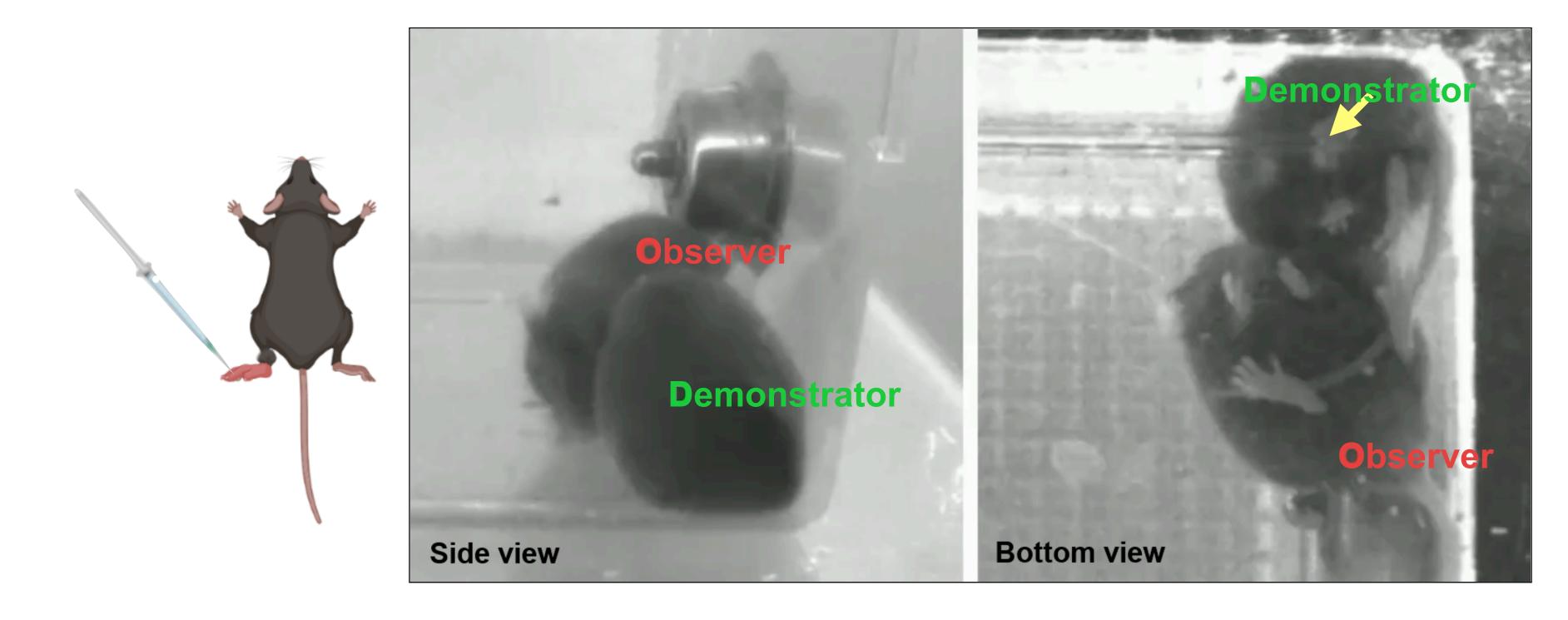




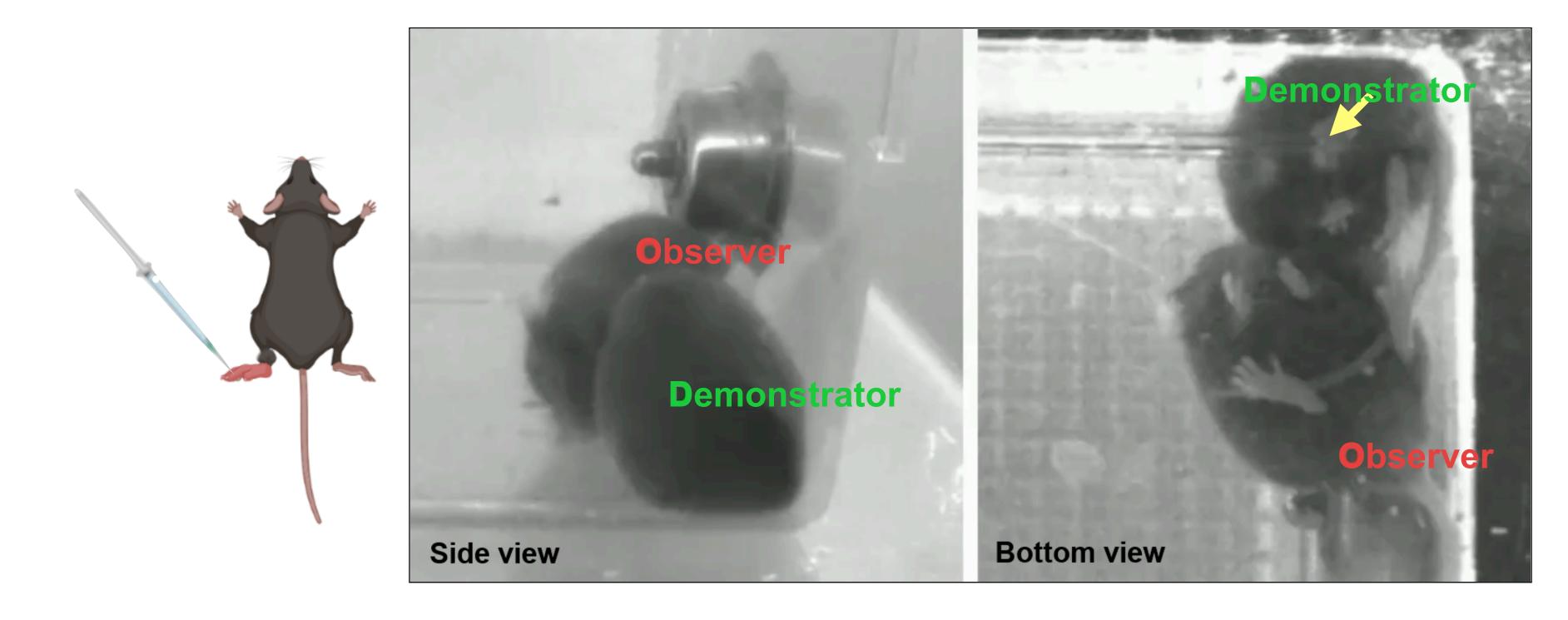




Social licking (allolicking) in response to other's localized pain/injury

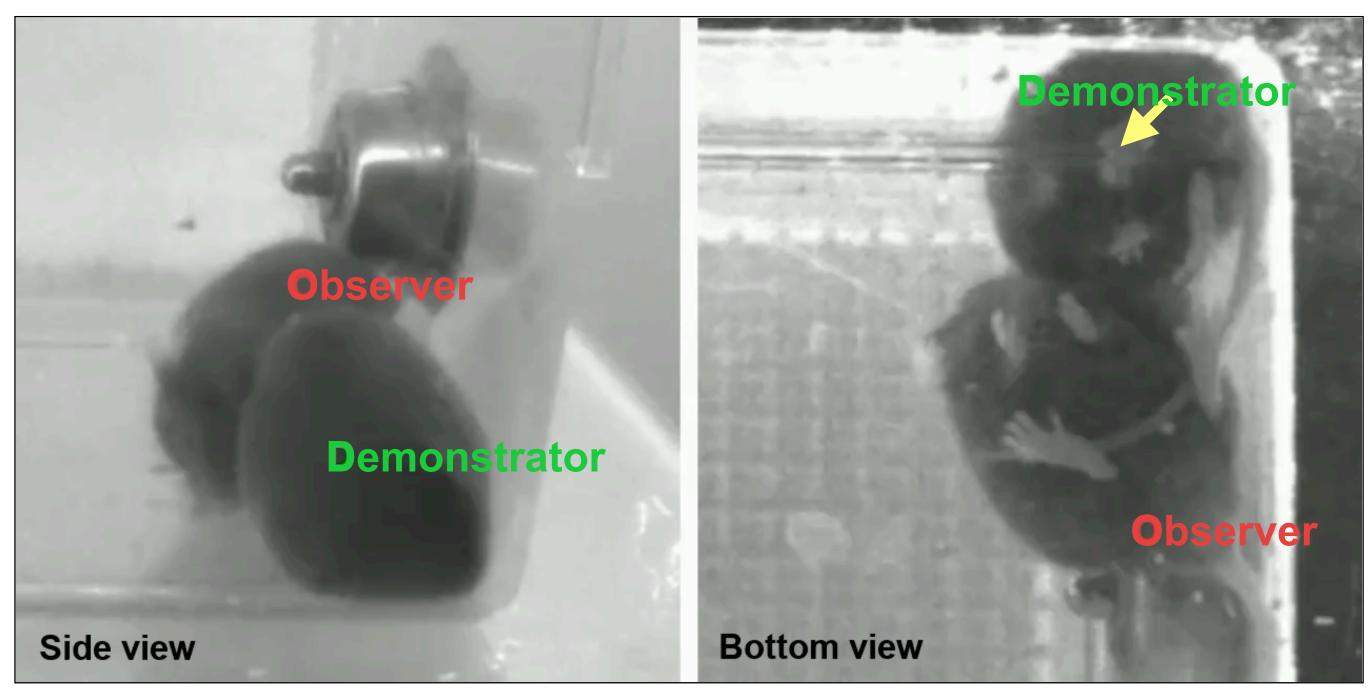


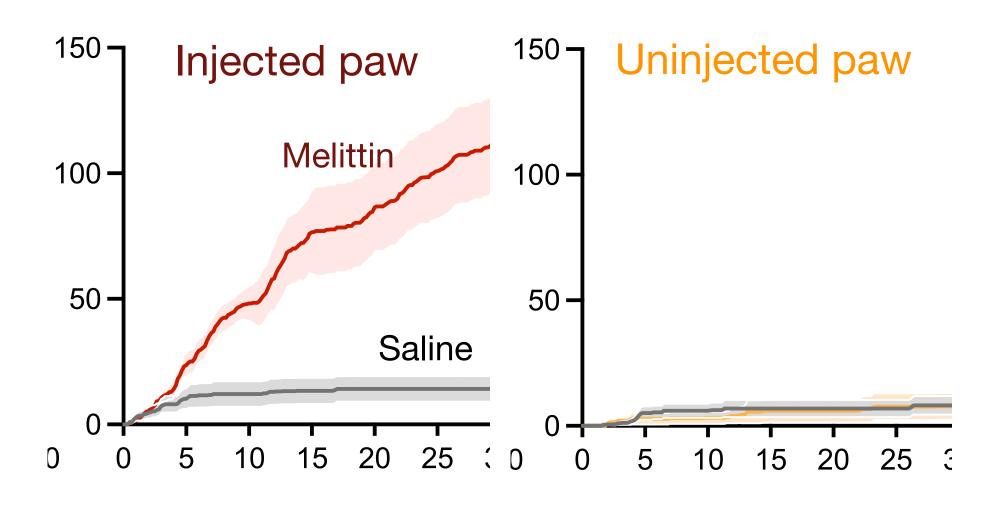
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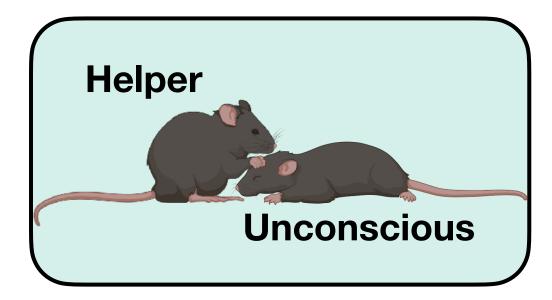




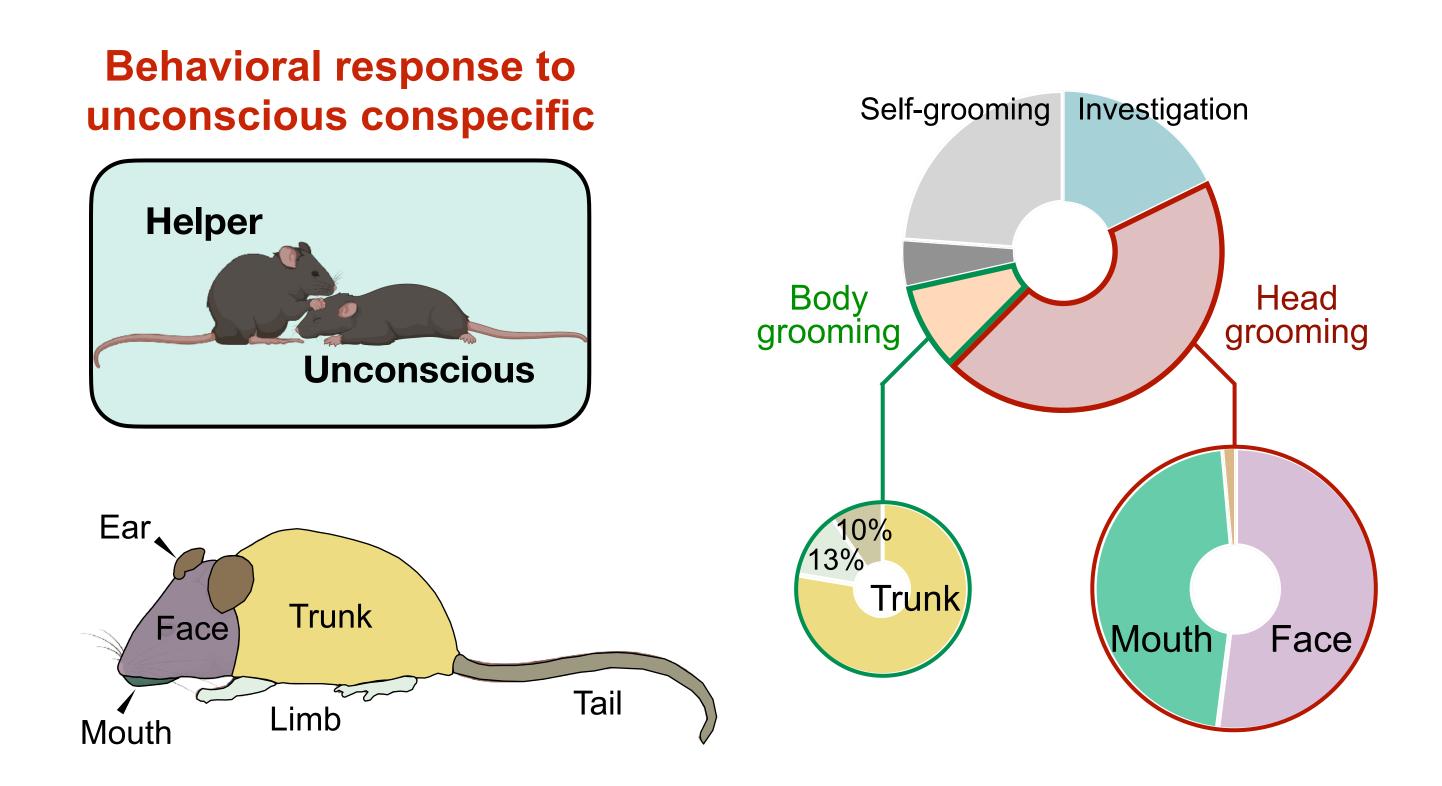


Rescue-like behavior towards unconscious animals

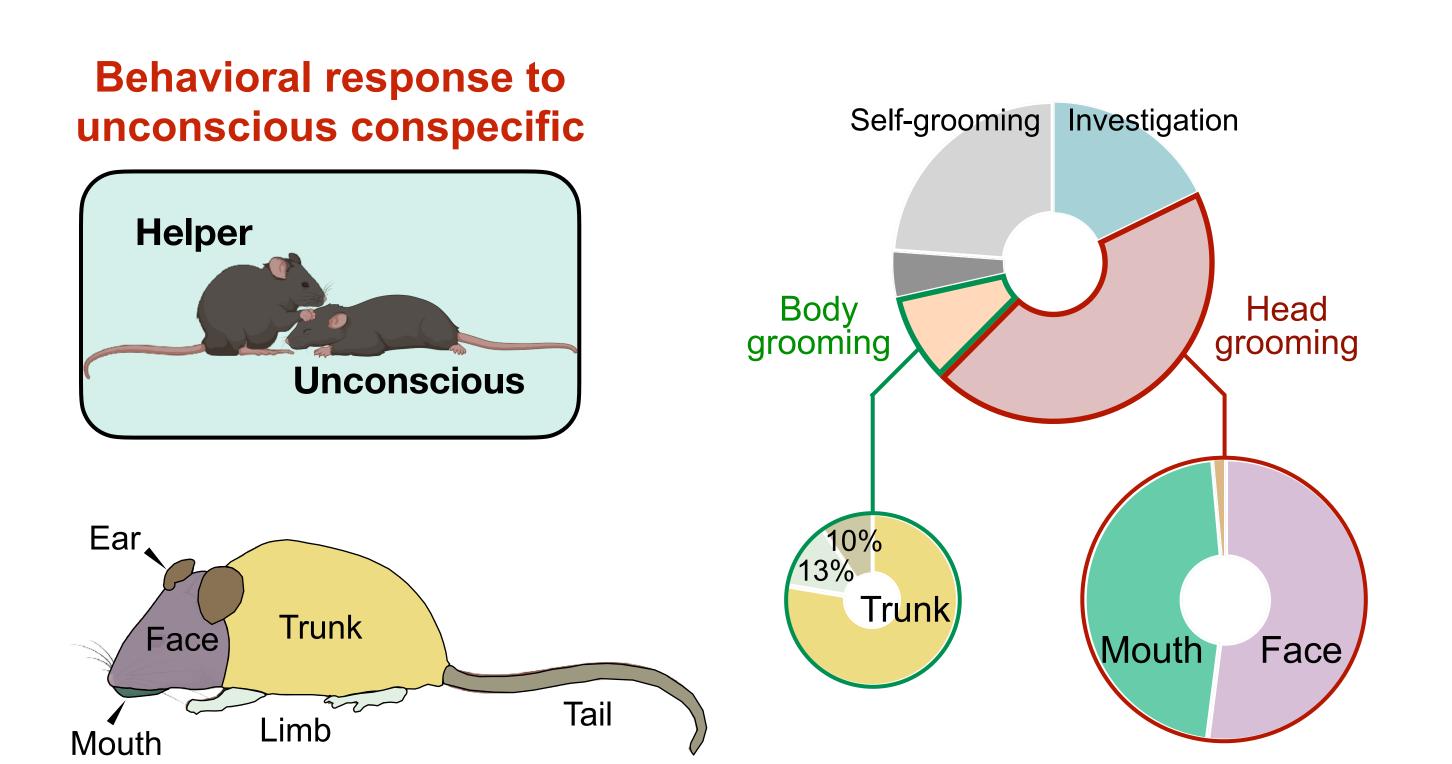
Behavioral response to unconscious conspecific

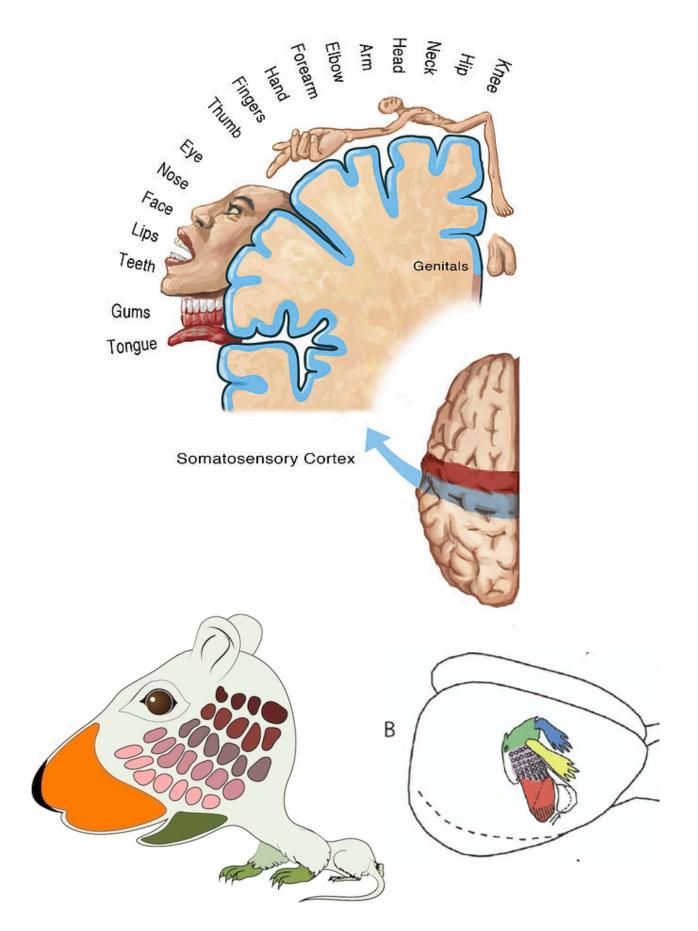


Rescue-like behavior towards unconscious animals



Rescue-like behavior towards unconscious animals





(Bjaalie *et al.* 2005)

Emotional stress

Localized pain

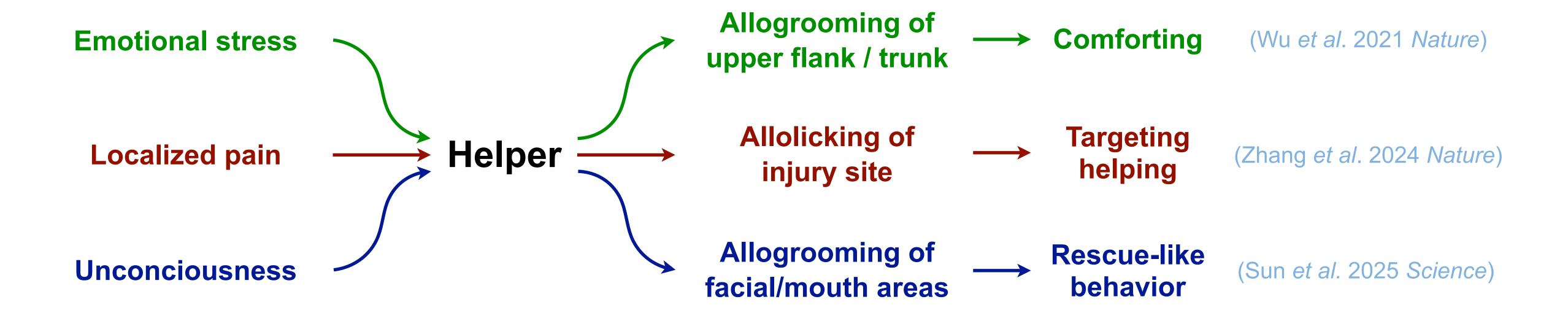
Unconciousness



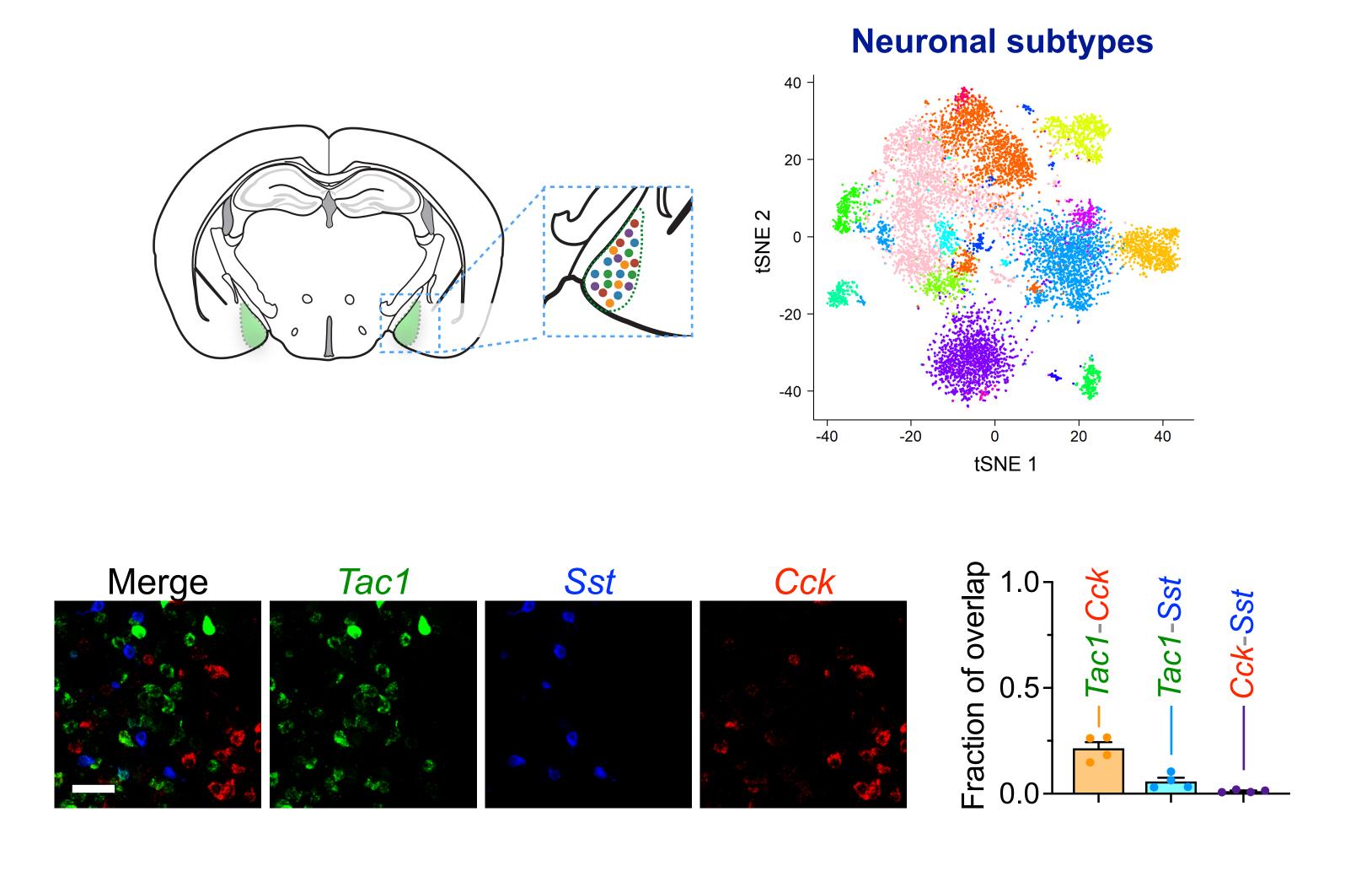
Unconciousness



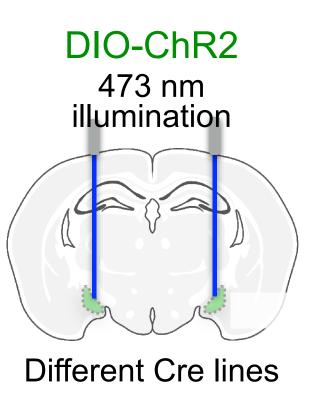
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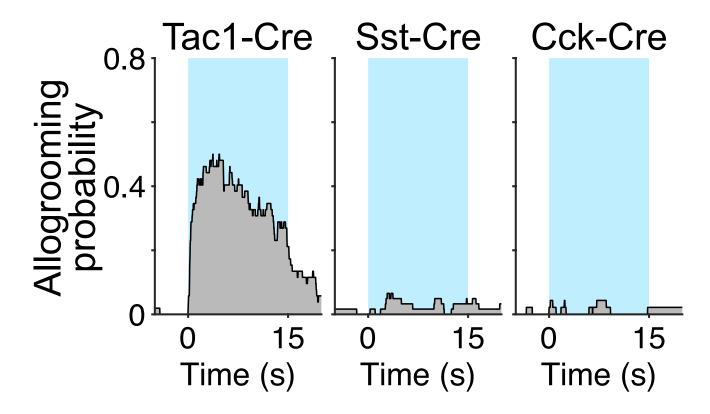


Neuronal cell types in the medial amygdala

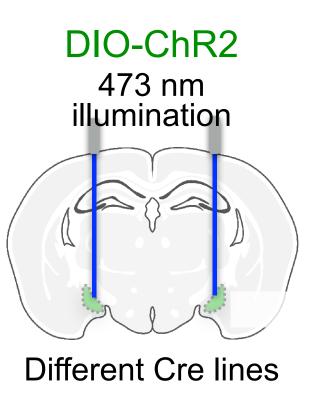


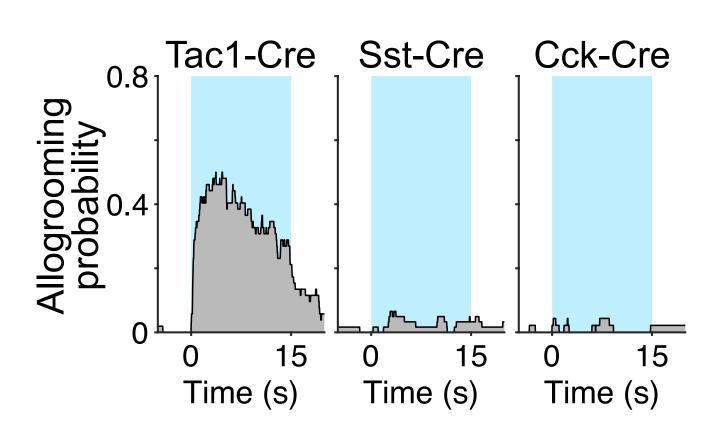
Medial amygdala Tac1+ neurons promote allogrooming

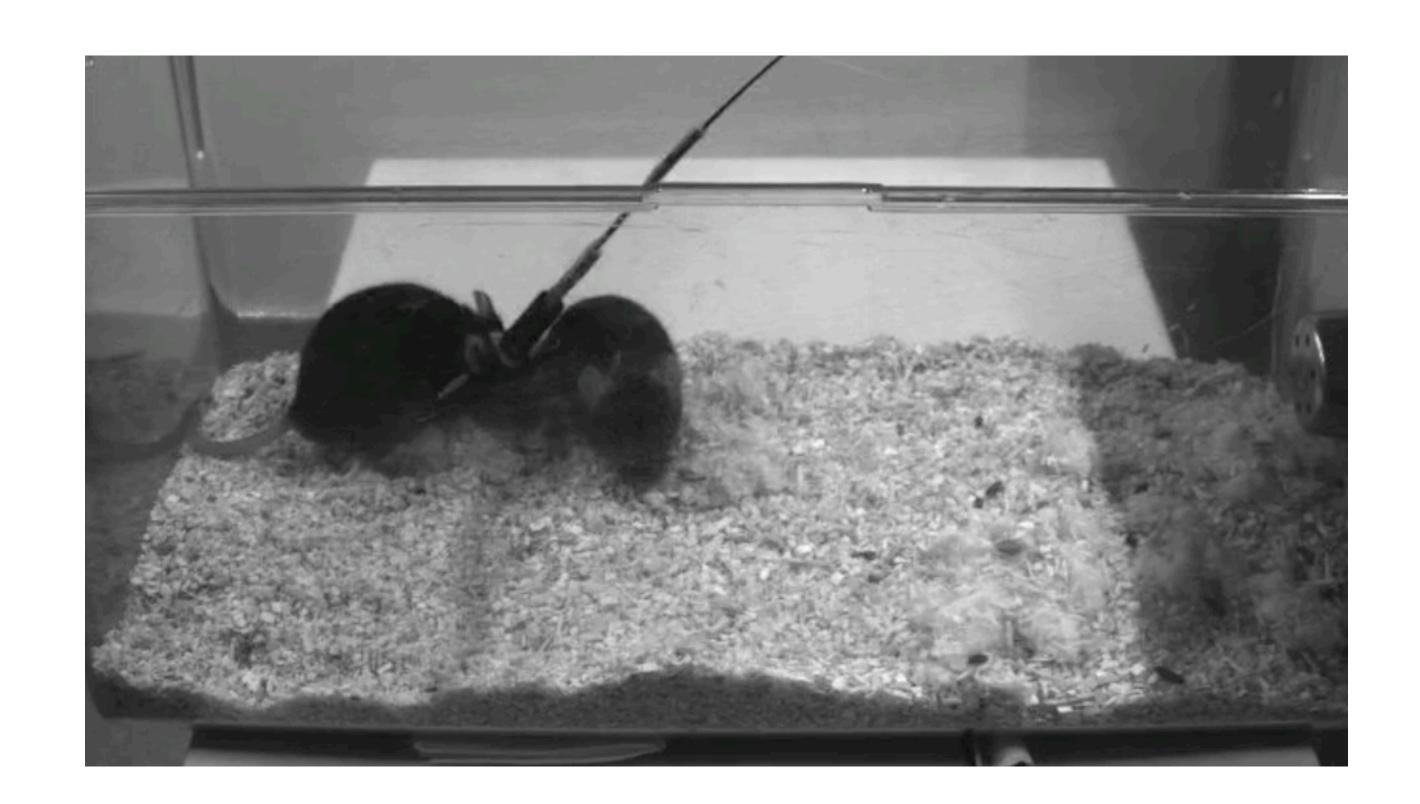




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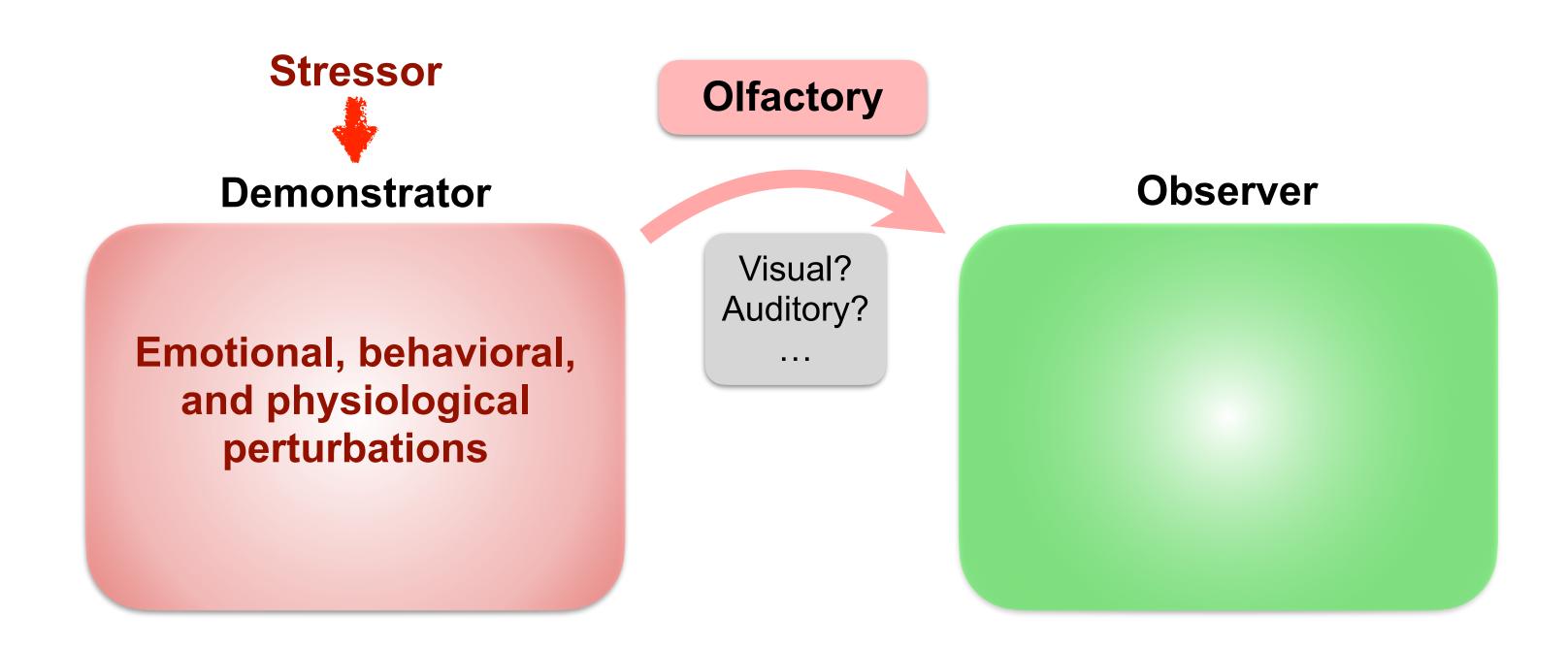


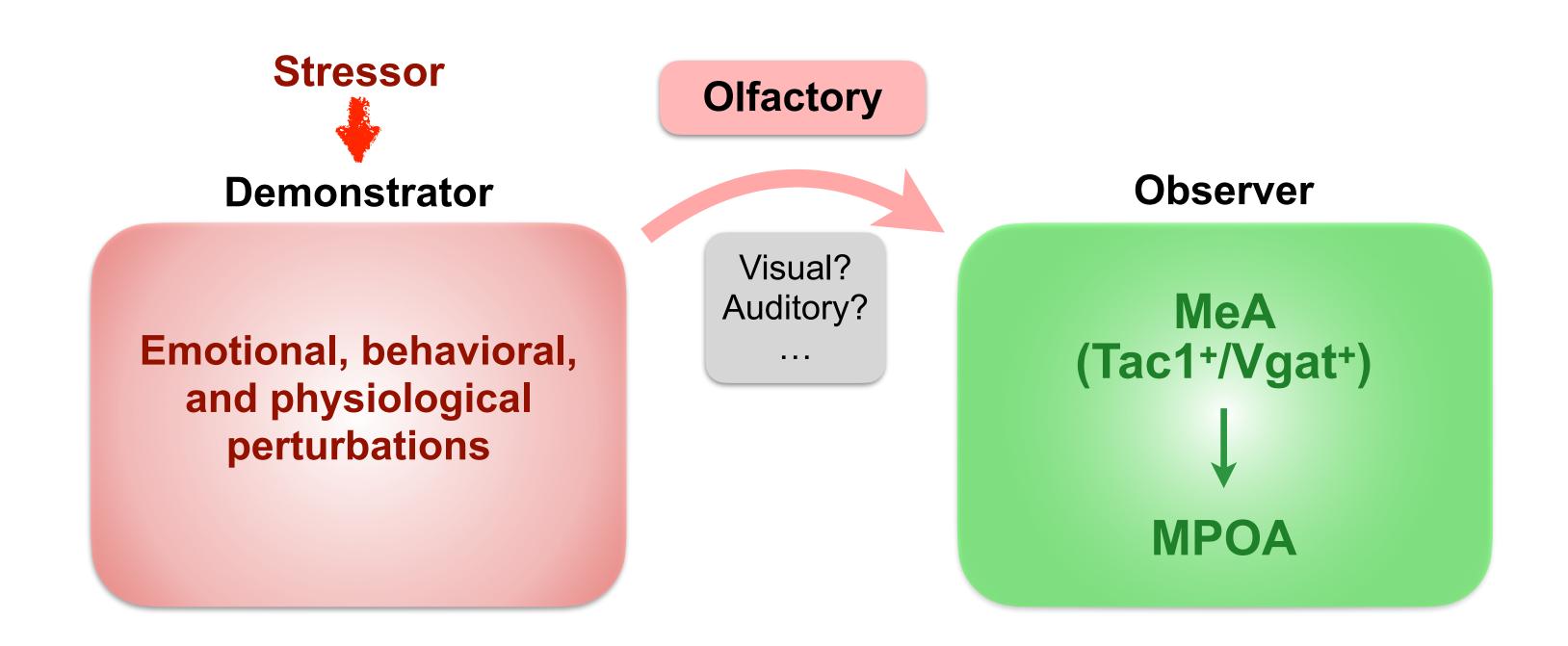


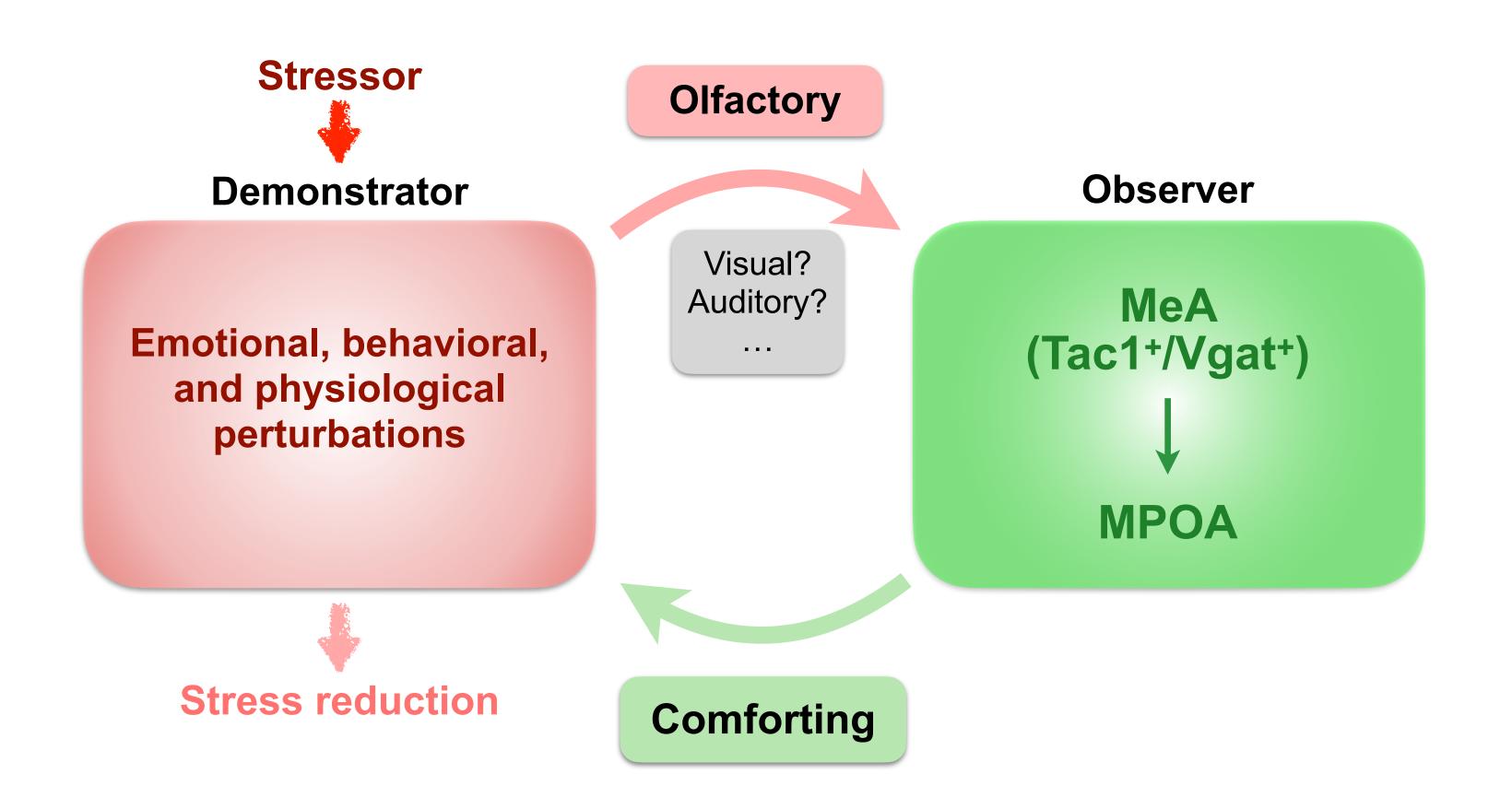




Emotional, behavioral, and physiological perturbations

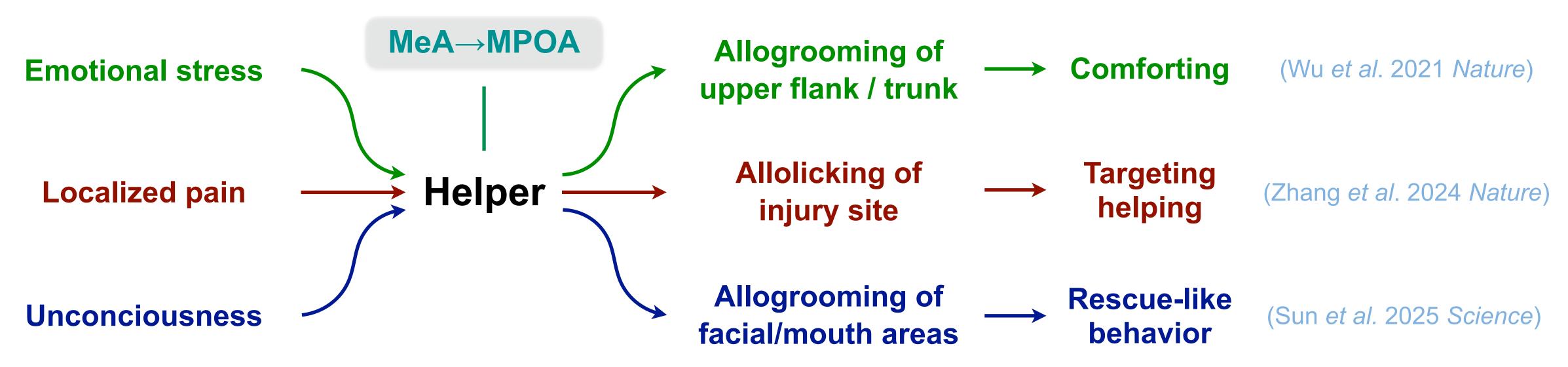






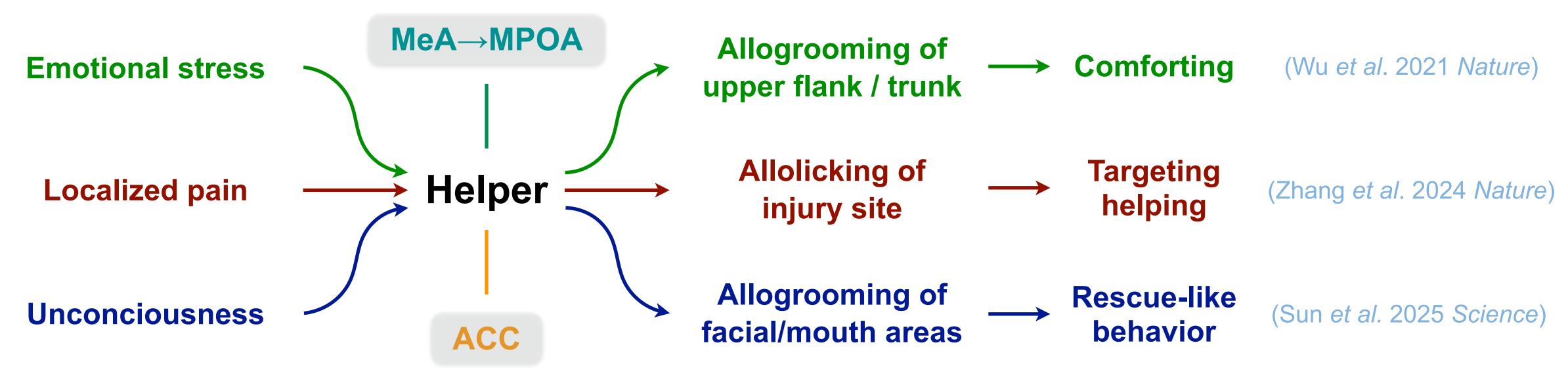
Summary

Recognize other's state
Drive allogrooming behavior



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Recognize other's state
Drive allogrooming behavior



Representation of self and other

Acknowledgements

- Hong Lab -



- Collaborators -







Funding Sources

(3)

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