

The Effect of Odor Cues Associated with Acute Morphine Withdrawal



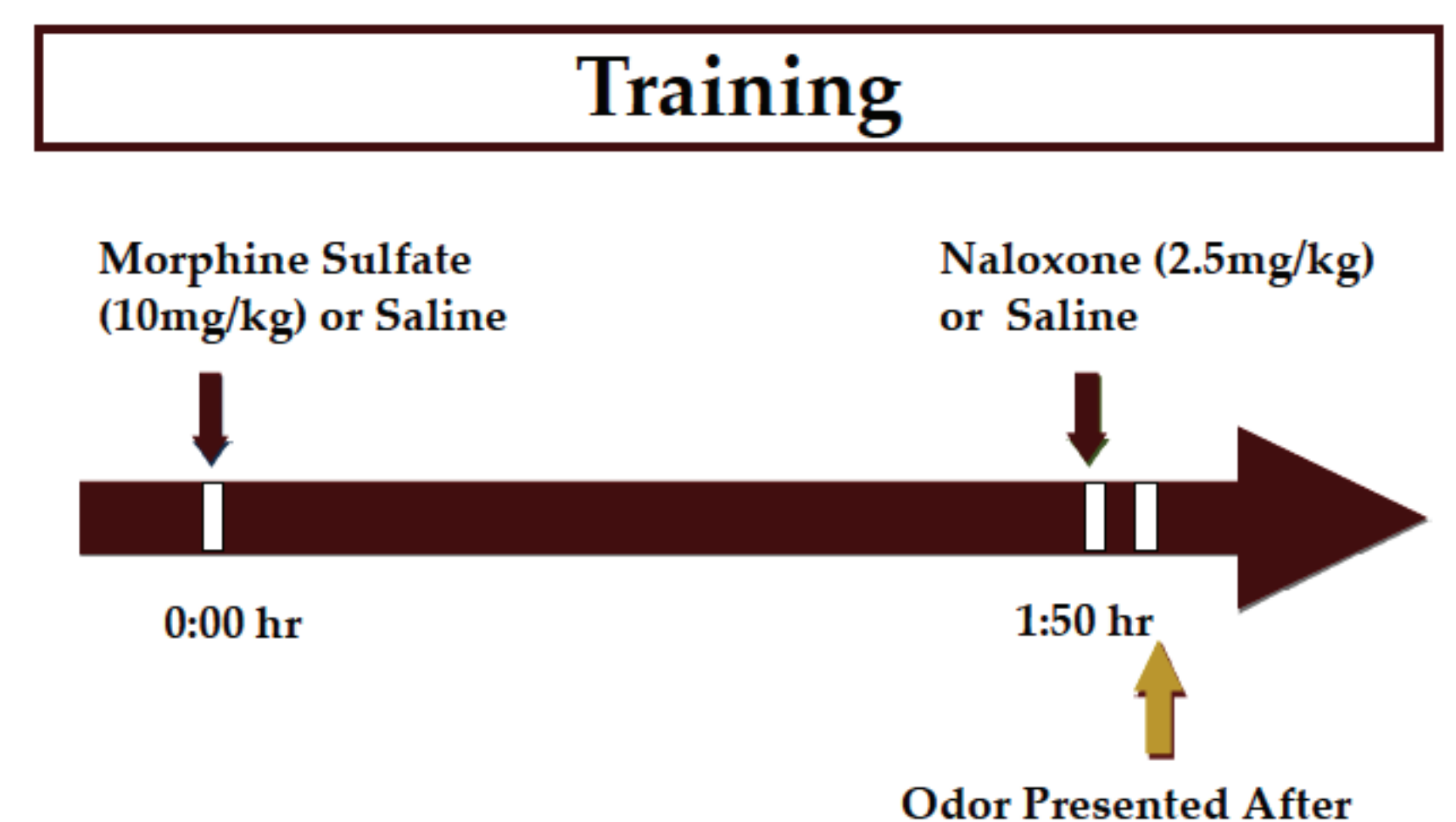
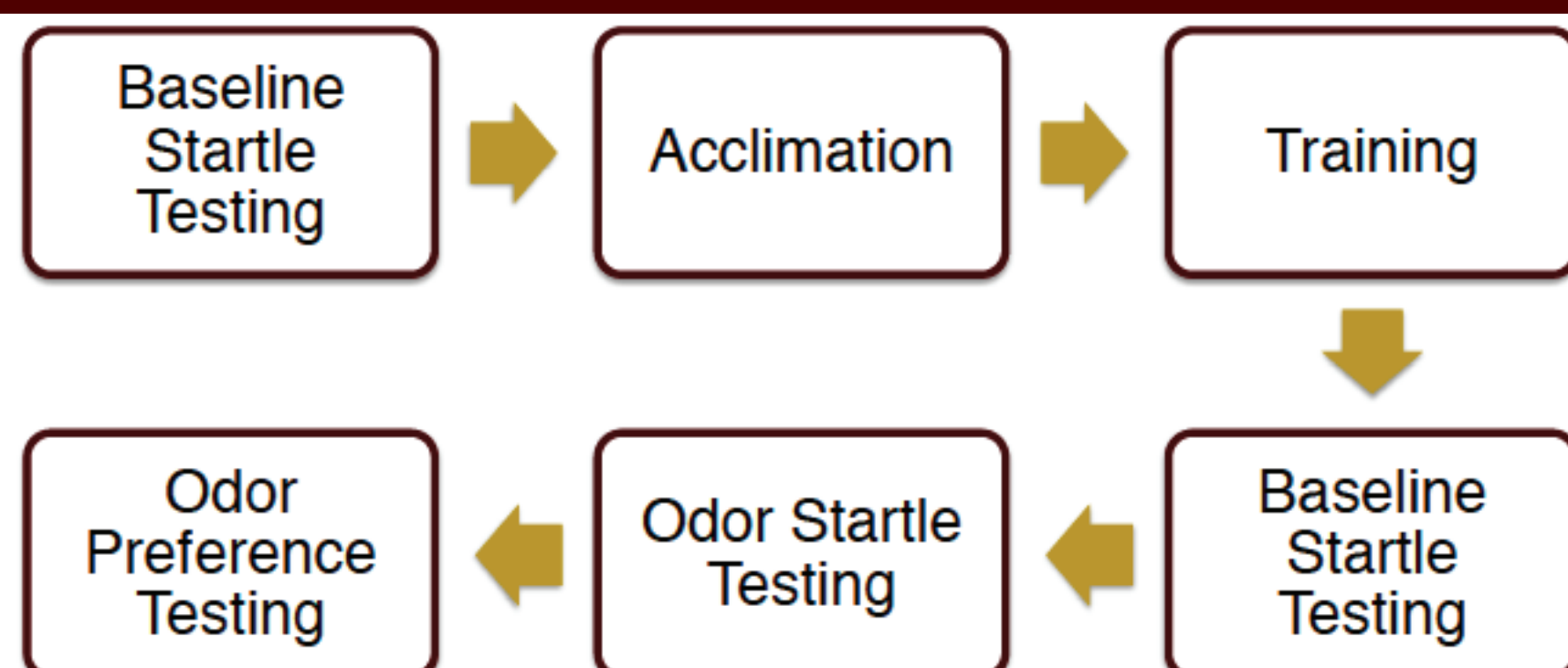
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Introduction

- Environmental cues, such as odors, associated with withdrawal can motivate drug use¹.
- Withdrawal following a single dose of opiate produces an elevation of the acoustic startle reflex, indicating a state of anxiety².
- Odors associated with aversive stimuli potentiate startle³, and odors associated with pleasurable stimuli attenuate startle⁴.
- The purpose of this study was to examine if odors paired with withdrawal from acute morphine can elevate anxiety in the rat

Methods



Day	Lemon	Lemon & Vanilla	Lemon & Mint
1, 3	MOR or SAL + NAL or SAL	MOR or SAL + SAL	MOR/NAL
2, 4		MOR or SAL + NAL	SAL/SAL
	* Same Protocol Each Training Day	** Present Odor 10 min. Before 2 nd Injection	** Present Odor 10 min. Before 2 nd Injection

Startle Testing

105 dB startle stimulus before and after odor presentation

Odor Preference Index



Results

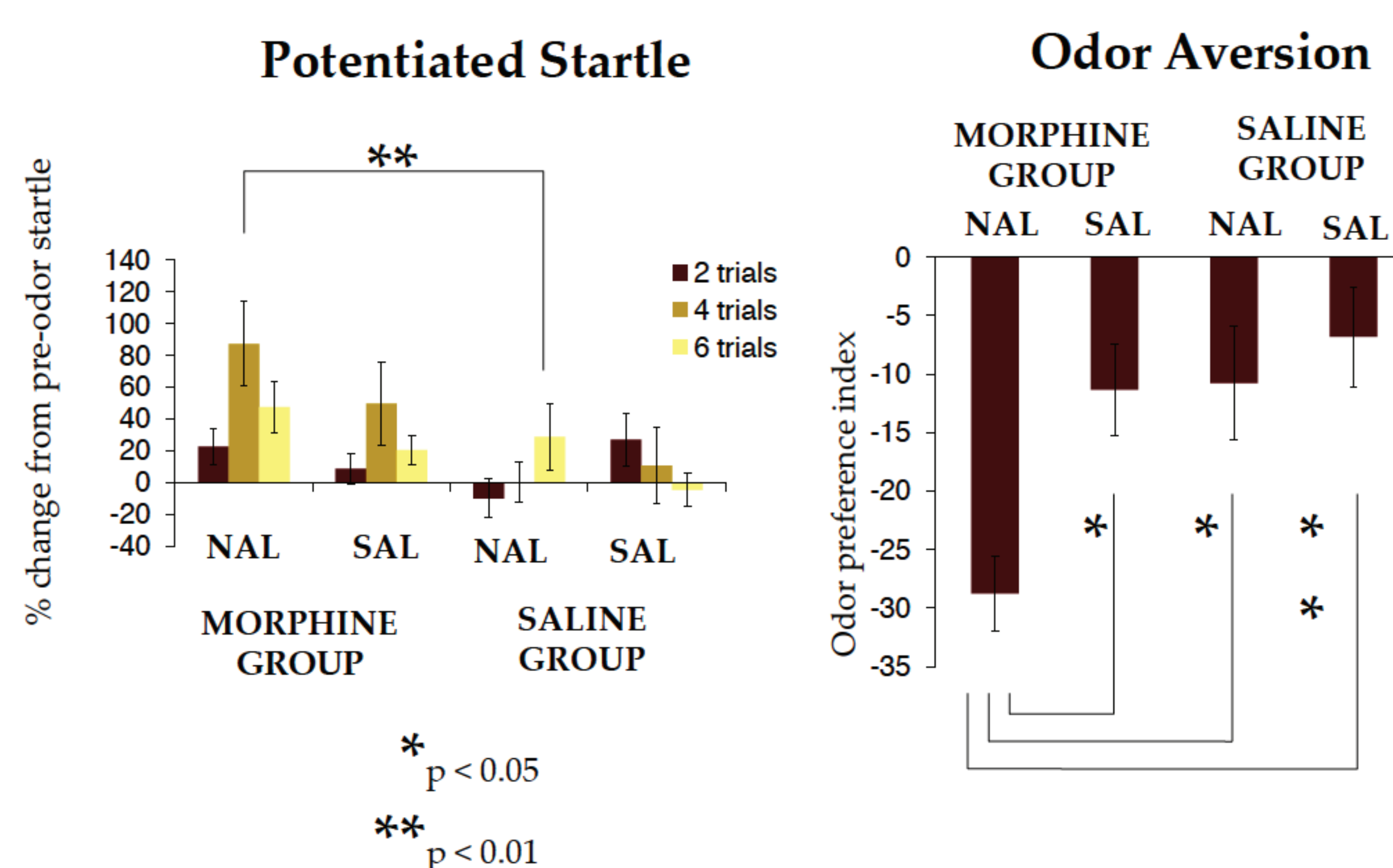


Figure 1: Single Cue Experiment: Lemon
Rats show potentiation of startle to the withdrawal-paired odor (a). Rats receiving MOR/NAL show significantly more aversion to the withdrawal-paired odor compared to all other groups (b).

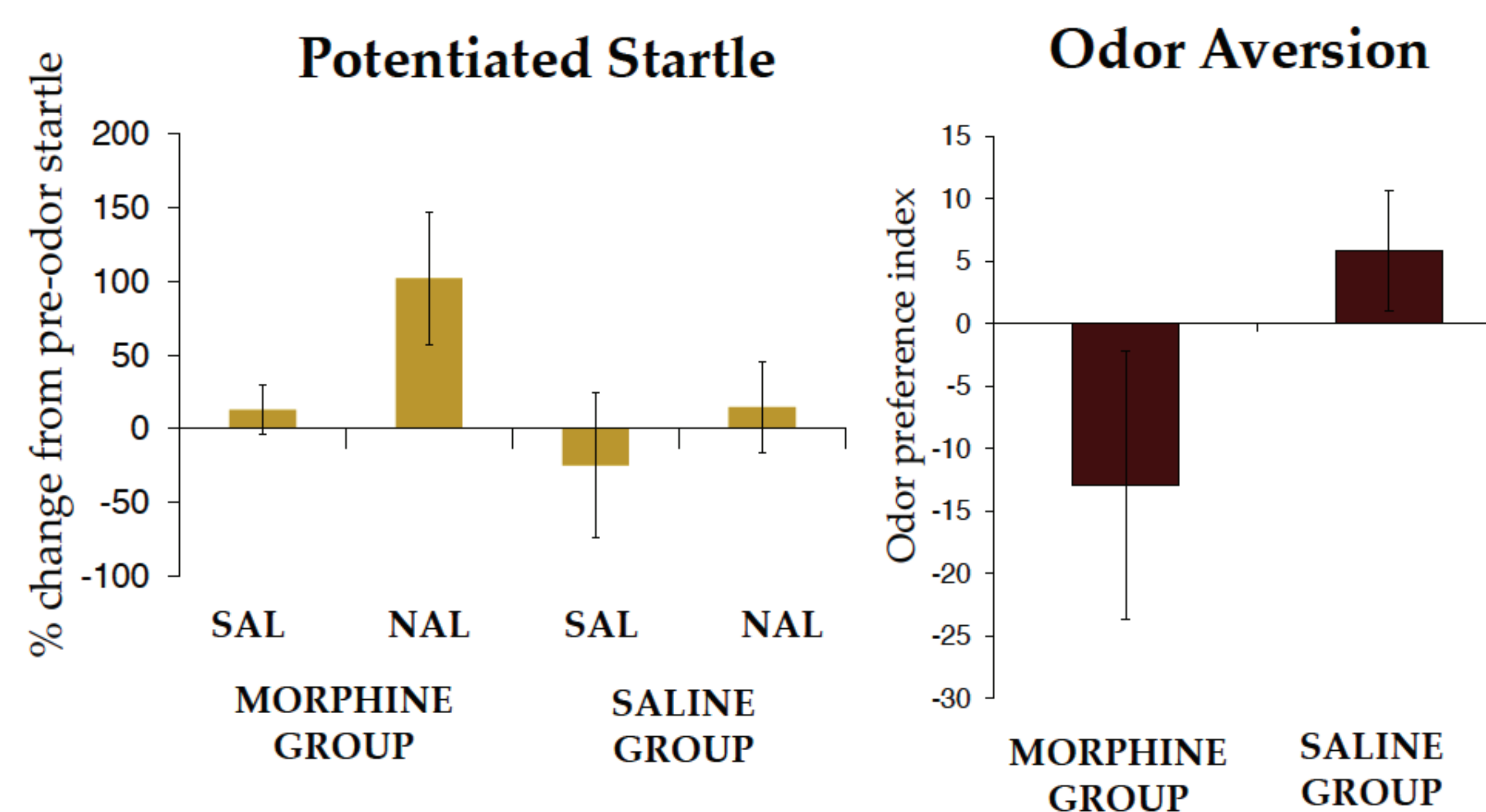


Figure 3: Two Cue Experiment: Lemon and Vanilla
Withdrawal –paired odor potentiates the startle response in MOR/NAL rats (a). Rats receiving MOR showed an aversion to the withdrawal-paired odor compared to animals receiving SAL.

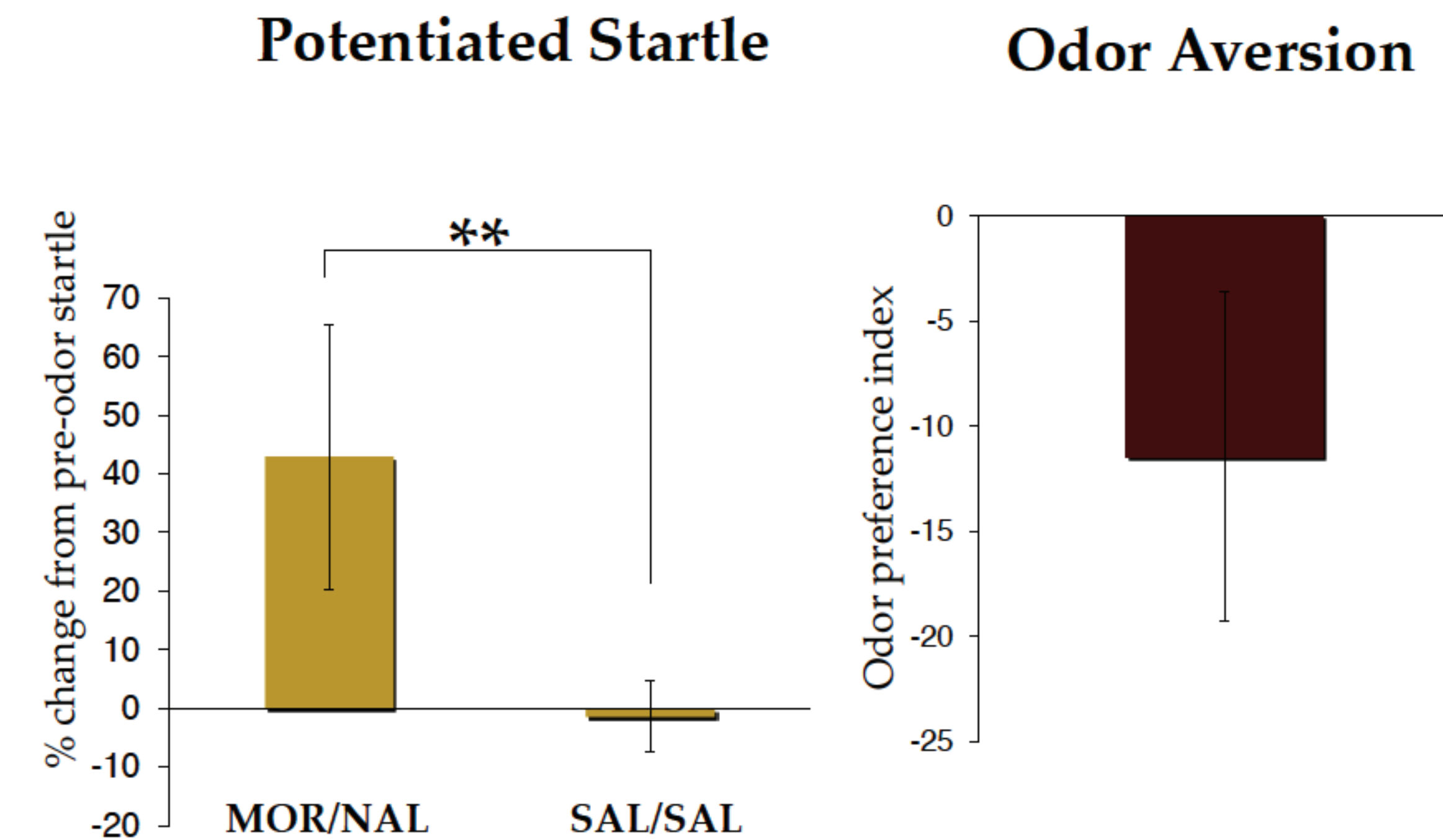


Figure 2: Two Cue Experiment: Lemon and Mint
Withdrawal –paired odor potentiates the startle response in the MOR/NAL group compared to SAL/SAL (a). Both groups showed an aversion to the withdrawal-paired odor (b).

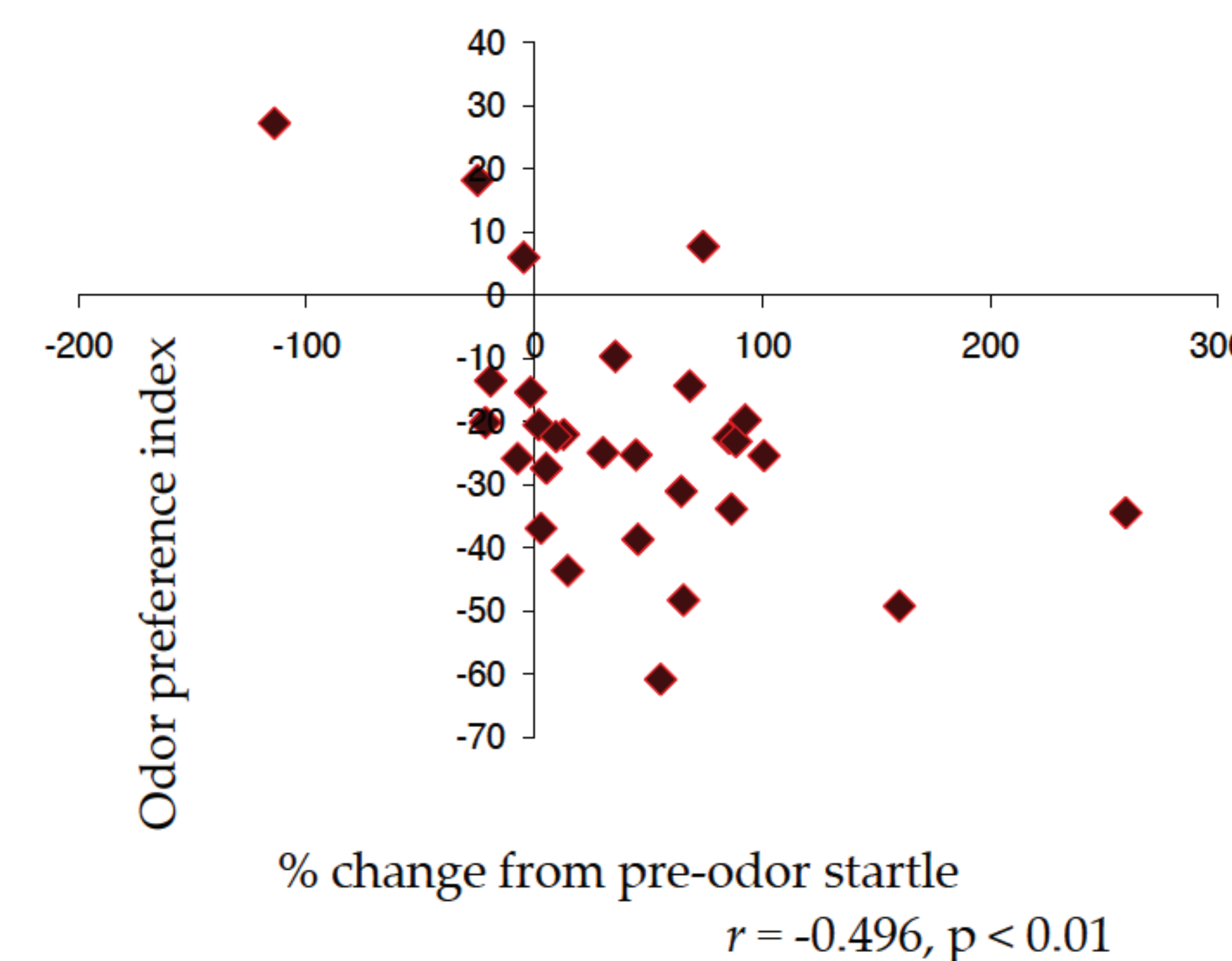


Figure 4: Correlation of Startle and Place Preference
Startle potentiation shows a significant negative correlation with preference for the withdrawal-paired odors.

Conclusions

- These findings suggest that odors associated with drug withdrawal elevate anxiety in rats.
- Startle potentiation is negatively correlated with odor preference index.
- Olfactory mediated cues may play a role in relapse to drug taking behavior.

Future Directions

- Investigate the mechanism by which olfactory cues lead to potentiation of startle.
- Investigate the effect of natural odors on these behaviors.

References

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