

Preexposure effects

Preexposure effects: the consequences of preexposing an organism to various aspects of the conditioning situation, including the CS, the US, and specific relations between CSs and USs.

US-preexposure effect: Preexposure to un signaled USs leads to a subsequent retardation of acquisition during CS-US pairings.

Latent inhibition or CS-preexposure effect: Nonreinforced preexposure to the CS leads to a subsequent retardation of acquisition during CS-US pairings.

Learned irrelevance: Random presentations of the CS and US lead to a subsequent retardation of acquisition during CS-US pairings.

US-preexposure effect

US-preexposure effect

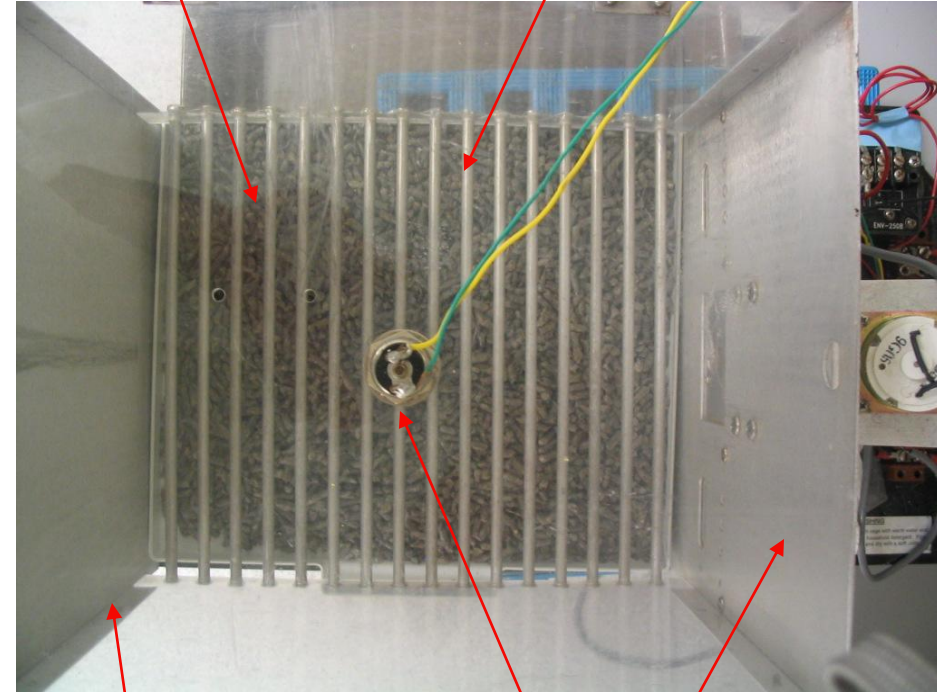
Group	Phase 1: Preexposure	Phase 2: Conditioning
PE	X: +	X: A+
Control	Y: +	X: A+

The control group is exposed to unsignaled presentations of the US, but in a non-target context.

An example of discriminable contexts used in our lab

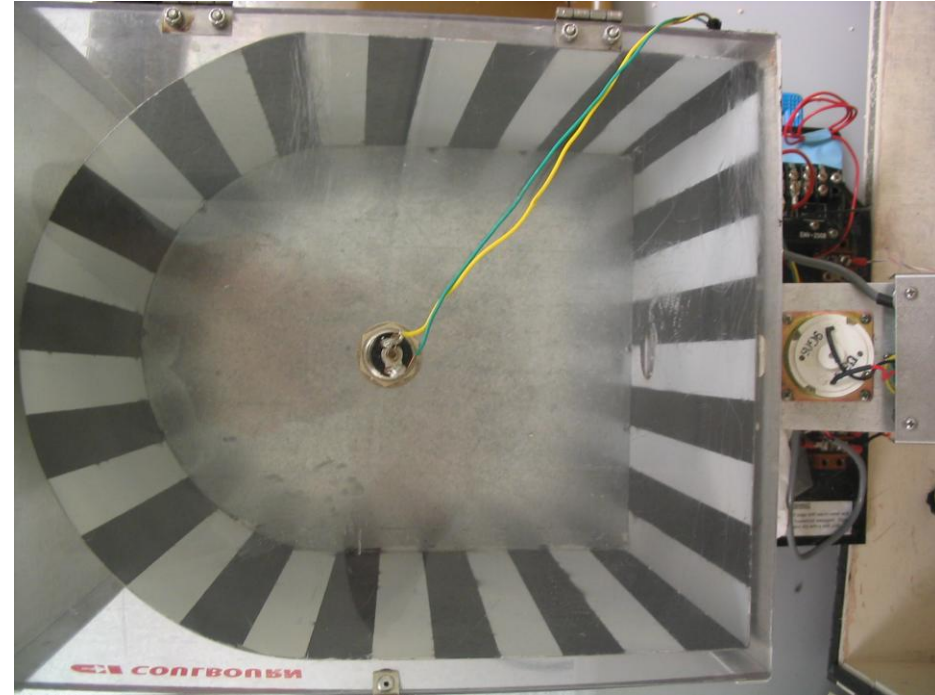
Olfactory

Tactile



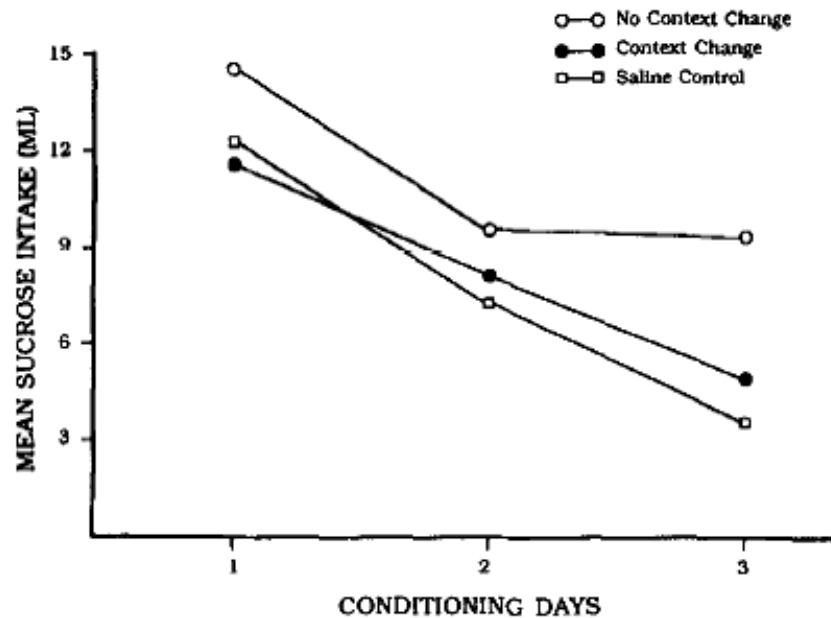
Spatial

Visual



The US-preexposure effect in conditioned taste aversion

Group	Preexposure	Conditioning
No Context Change	X: LiCl	X: Sac → LiCl
Context Change	Y: LiCl	X: Sac → LiCl
Saline Control	X: Sal	X: Sac → LiCl



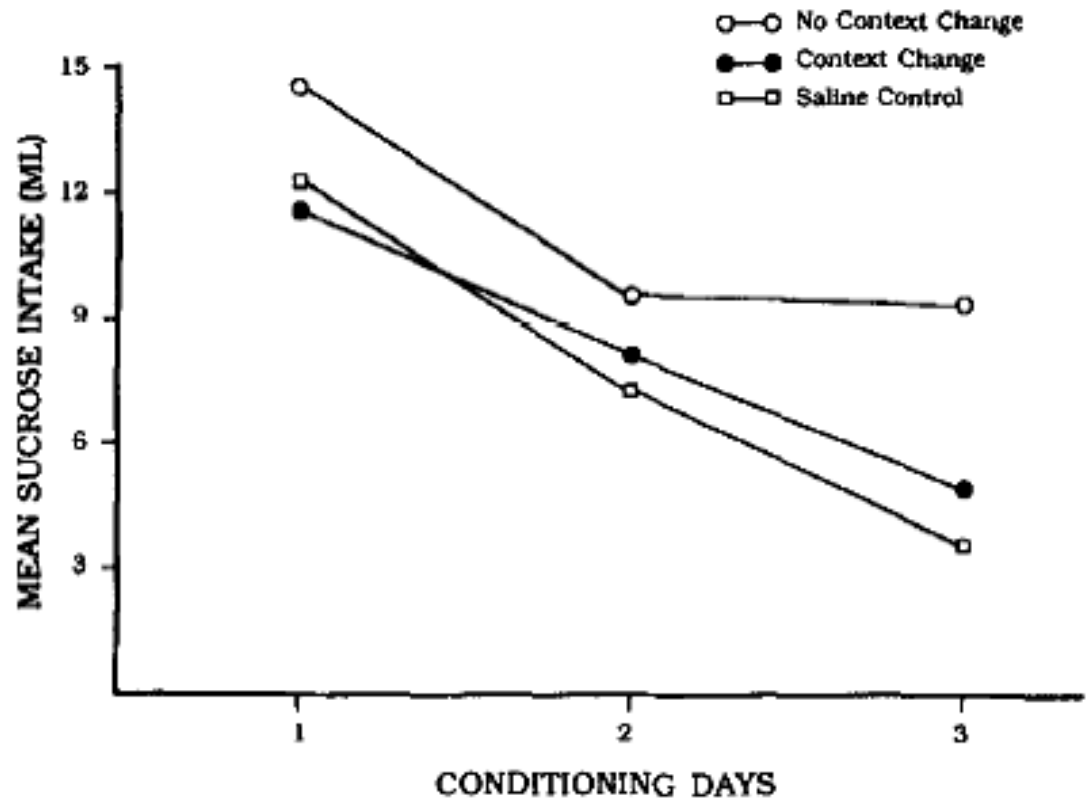
Role of contextual blocking in the US-preexposure effect

The RW model suggests that the US-preexposure effect may be thought of as a special case of blocking in which the blocking stimulus is the context.

Three procedures have been used to test this proposal:

(1) Contextual shift across phases (as shown before).

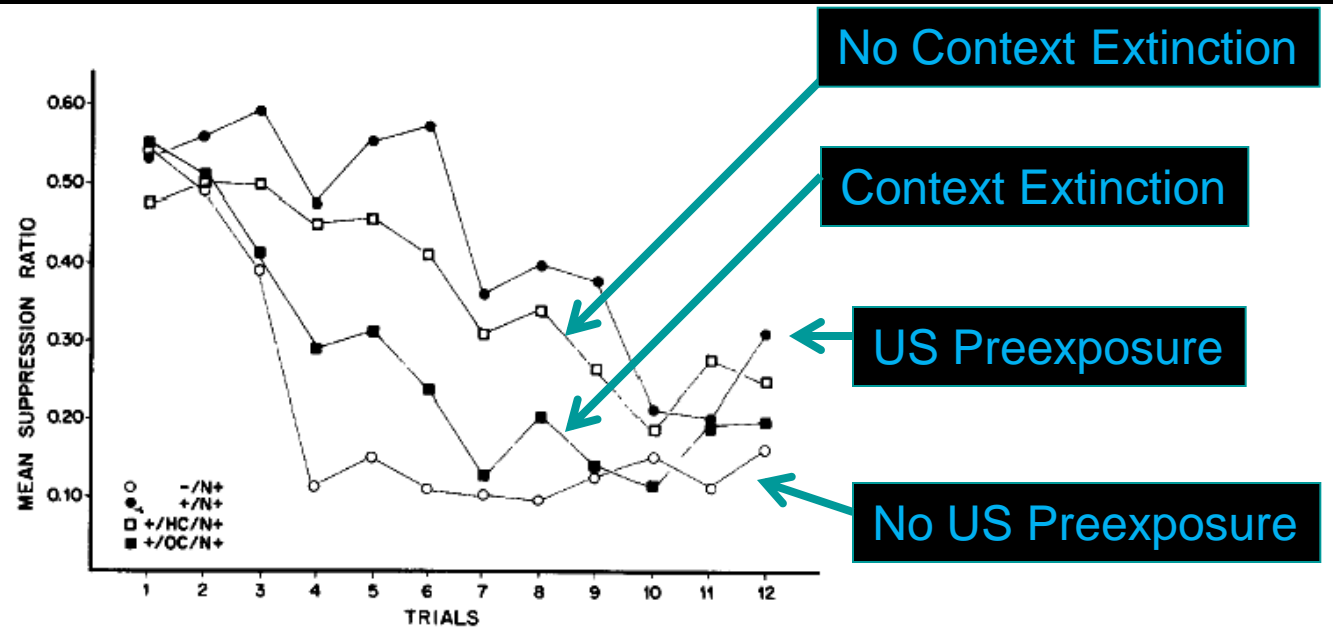
If retardation of acquisition occurs because of contextual blocking, then shifting to a new context during conditioning should eliminate the US-preexposure effect.



(2) Contextual extinction after the preexposure phase.

Reducing the value of the context through extinction should alleviate the US-preexposure effect.

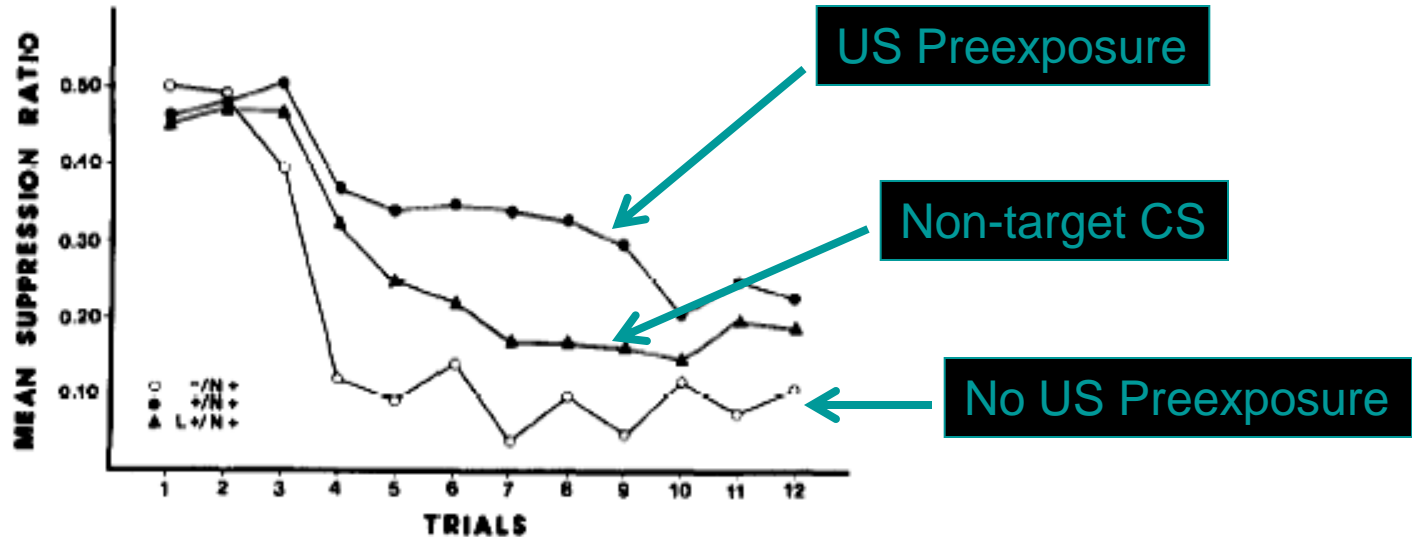
Group	Preexposure	Contextual Extinction	Conditioning
No Context Extinction	X: +	(10)HC	X: A+
Context Extinction	X: +	(10)X: -	X: A+
No US Preexposure	X: -	----	X: A+
US Preexposure	X: +	----	X: A+



(3) Signalling the USs with a non-target CS during preexposure should attenuate the US-preexposure effect.

The presence of the non-target CS during preexposure should overshadow contextual conditioning, thus rendering the context less capable of competing with the target CS during conditioning.

Group	Preexposure	Conditioning
Non-target CS	X: C+	X: A+
No US Preexposure	X: -	X: A+
US Preexposure	X: +	X: A+

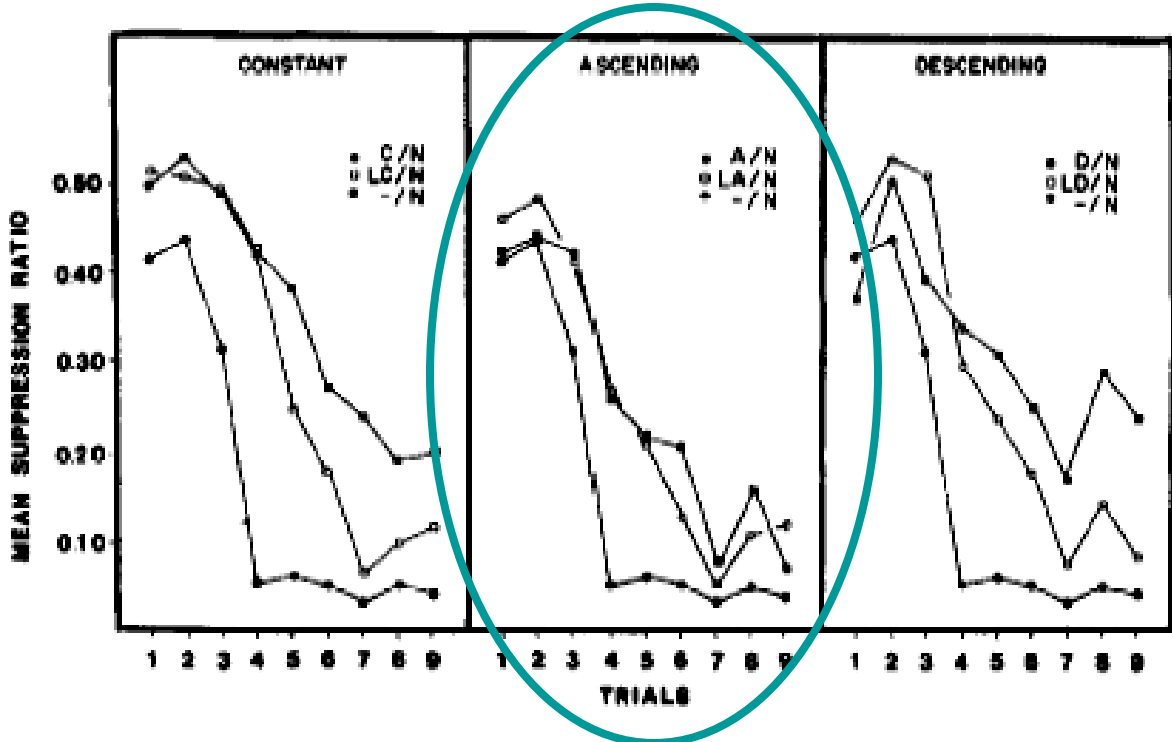


Nonassociative factors in the US-preexposure effect

Preexposing rats to an ascending series of shocks (increasing intensity) leads to a significant US-preexposure effect.

However, this effect is not eliminated by adding a non-target CS.

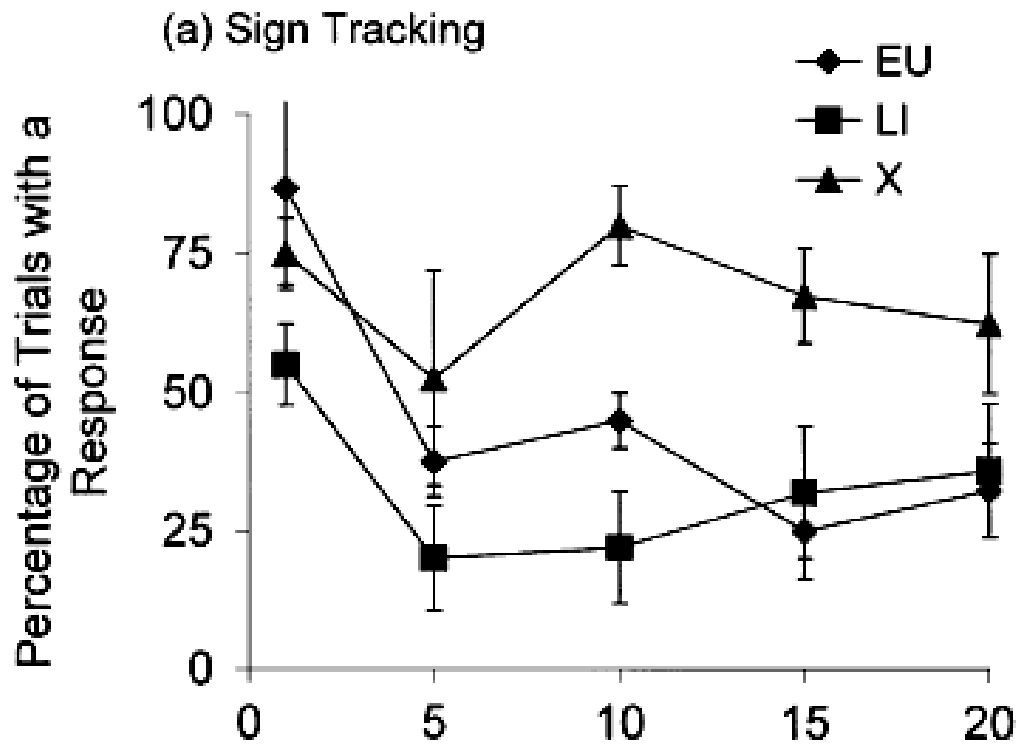
This suggest that the US-preexposure effect may be also a consequence of habituation to the US, especially with relatively weak USs.



Latent inhibition
(CS-preexposure effect)

Latent inhibition (or CS-preexposure effect)

Group	Phase 1: Preexposure	Phase 2: Conditioning
LI	X: A-	X: A+
X	X: -	X: A+
EU	X: -	X: A, +

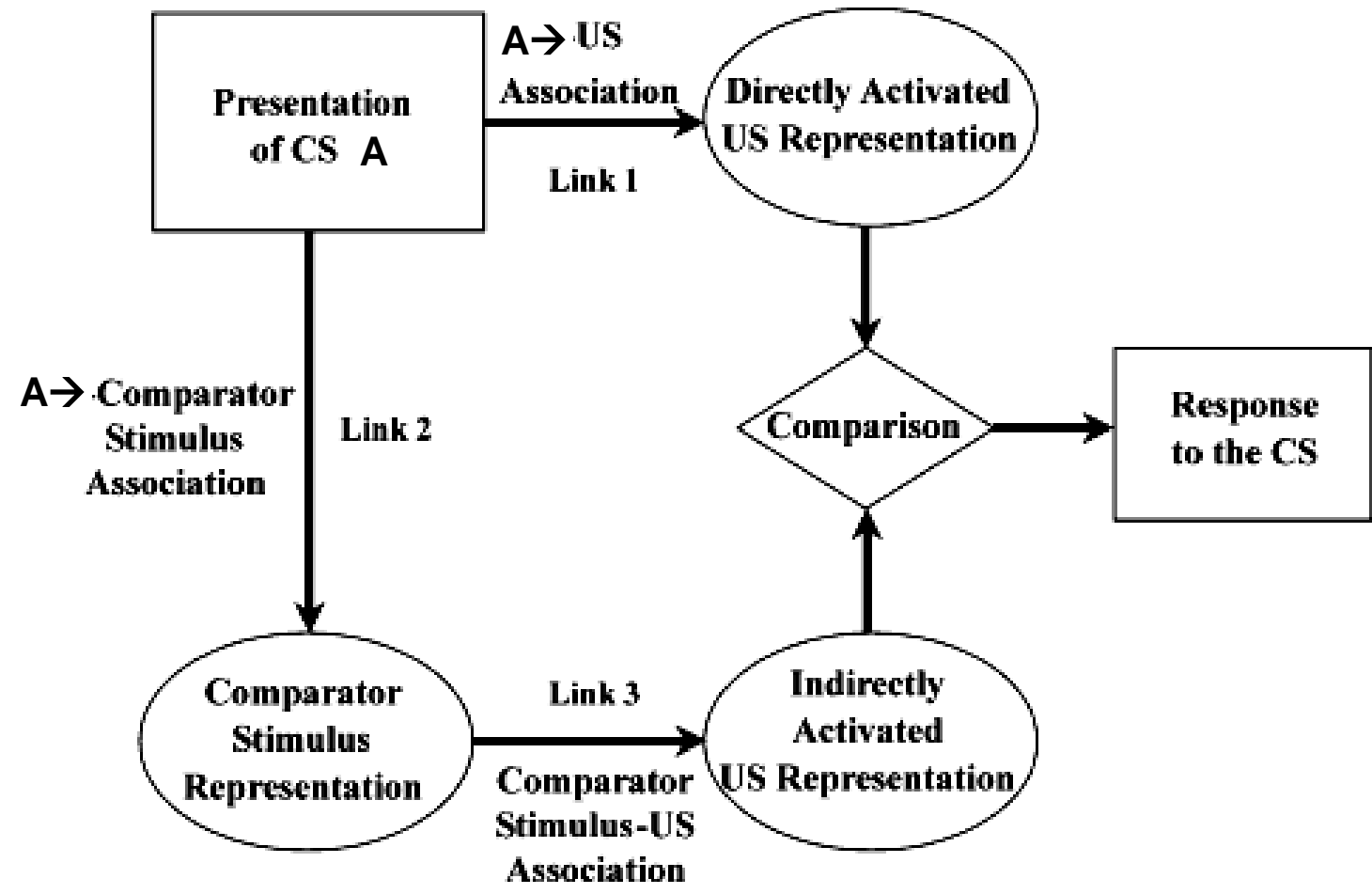


What causes latent inhibition?

Potential explanations:

- RW could account for LI by assuming that CS- training in Phase 1 lowers the alpha value of the CS. However, RW has no mechanism for changing alpha. In fact, it is assumed that alpha is constant.
- Pearce & Hall (1980) suggested that conditioning depends not on changes in the processing of the US (as postulated by RW), but on changes in the processing of the CS.
 - CS- training in Phase 1 leads to decreased associability.
 - Therefore, CS acquisition is retarded in Phase 2.
- CS priming by the context (Wagner, 1976).
 - Animal learns a $X \rightarrow CS$ association in Phase 1.
 - X primes the CS in Phase 2, reducing surprisingness.
 - Reduced surprisingness leads to retardation of acquisition in Phase 2.
- Comparator hypothesis (Miller & Schachtman, 1985).
 - Phase 1 creates a $CS \rightarrow X$ association.
 - In Phase 2, the $CS \rightarrow US$ association is compared with a strong $CS \rightarrow X \rightarrow US$ comparator term, thus retarding acquisition.

Comparator hypothesis

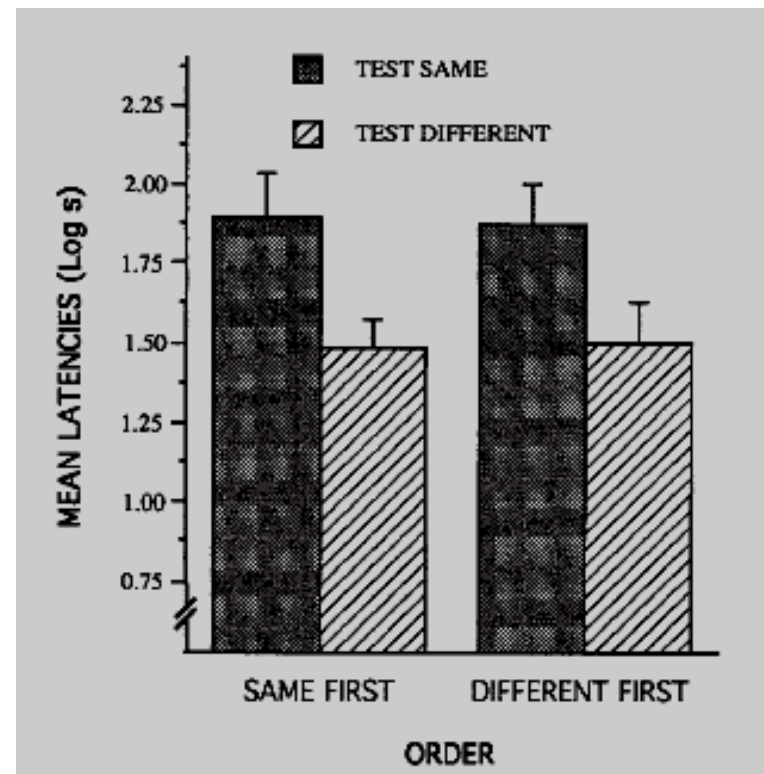


Testing the comparator hypothesis: Postconditioning contextual extinction

Phase 1: Preexposure	Phase 2: Conditioning	Phase 3: Extinction	Test
{ X: A- and Y: B-	X: A+ and Y: B+	X: -	Same: X: A? and Different: Y: B?

• Within-subject design

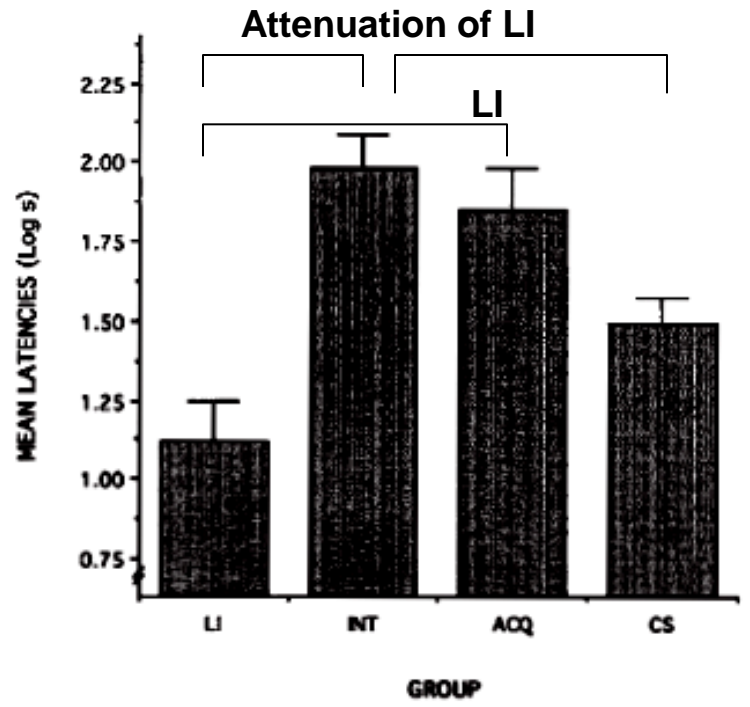
- +: shock
- X, Y: discriminable contexts
- A, B: discrete CSs, tone and noise
- Dep. var.: latency to complete 10 s of licking in the presence of the CS
- Context extinction was counterbalanced



Testing the comparator hypothesis: Preconditioning CS→X “extinction”

Group	Phase 1: Preexposure	Phase 2: “Extinction”	Phase 3: Conditioning	Test
LI	X: A-	Y: B-	X: A+	Z: A?
INT	X: A-	Y: A-	X: A+	Z: A?
ACQ	HC	Y: B-	X: A+	Z: A?
CS	X: A-	X: A-	X: A+	Z: A?

- +: shock
- X, Y, Z: discriminable contexts
- A, B: discrete CSs, tone and noise
- Dep. var.: latency to complete 10 s of licking in the presence of the CS



Is the context control appropriate?

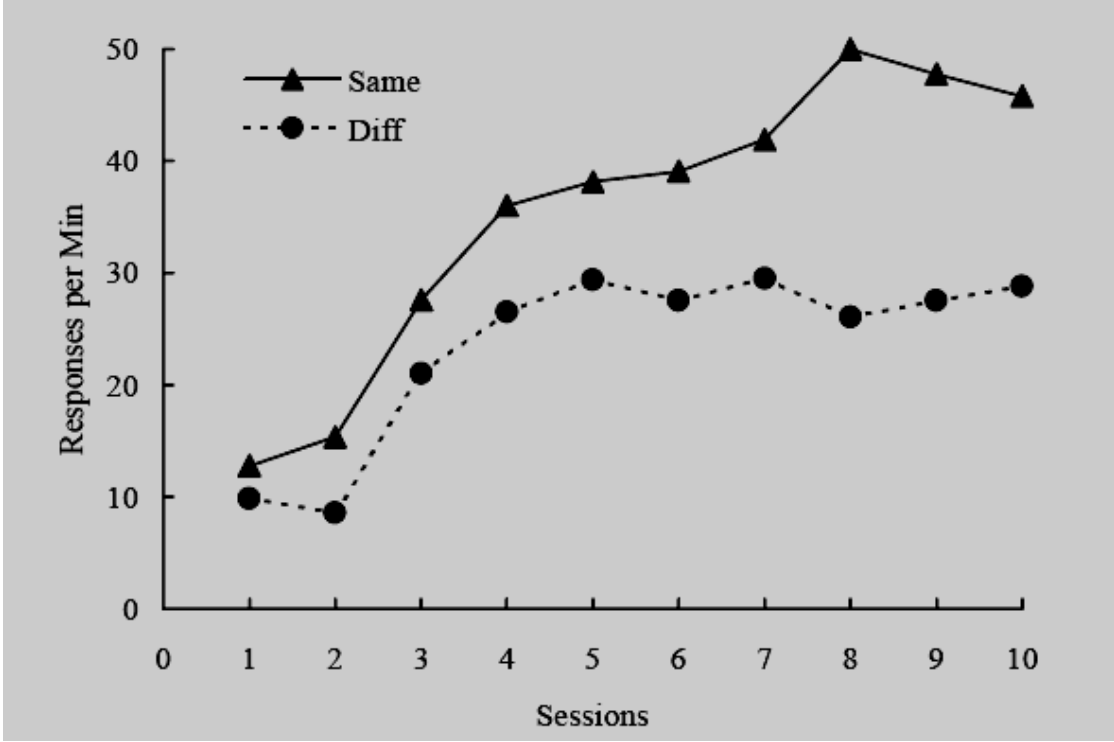
Group	Phase 1: Preexposure	Phase 2: Conditioning
LI	X: A-	X: A+
Control	X: -	X: A+

- Nonreinforced preexposure to the training context in Phase 1 may impair the context's ability to associate with the US in Phase 2.
- Impaired $X \rightarrow US$ association implies reduced competition for the $CS \rightarrow US$ association.
- Thus, rather than retardation of acquisition to the CS in the preexposed group, it may be enhanced acquisition to the CS in the control group.

Latent inhibition of the context

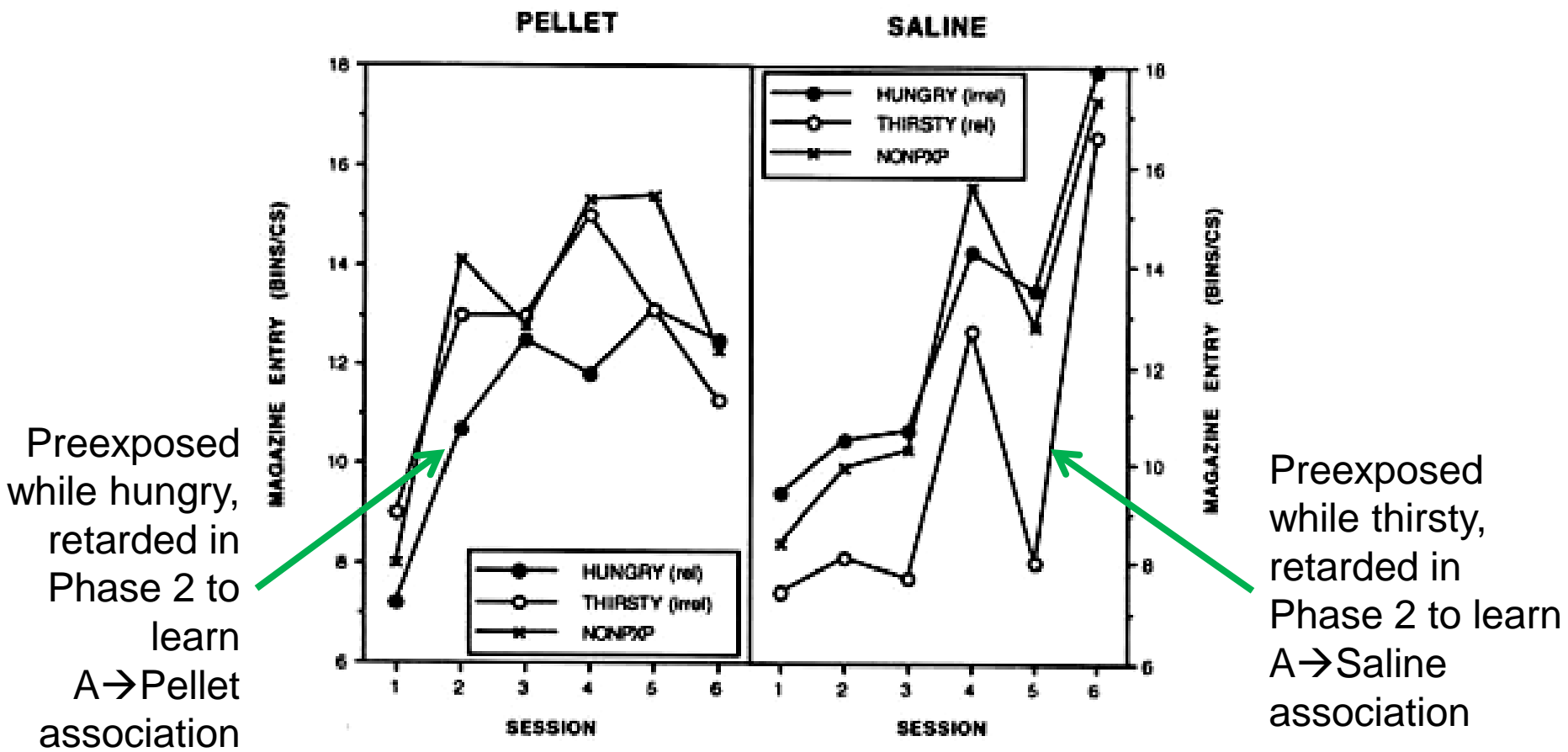
Group	Phase 1: Preexposure	Phase 2: Conditioning
Same	X: -	X: A+
Different	Y: -	X: A+

- +: food
- X, Y: discriminable contexts
- A: lever presentation
- Dep. var.: rate of lever pressing



Latent inhibition and motivation

Group	Phase 1:	Phase 2:
Pellet	H: A-, T: B-	H&T: A+p, B+p, C+p
Saline	T: A-, H: B-	H&T: A+s, B+s, C+s



Learned irrelevance

Learned irrelevance

Group	Phase 1: Preexposure	Phase 2: Conditioning
Random	X: A / +	X: A+
LI control	X: A-	X: A+
US-only control	X: +	X: A+
OA	HC	X: A+

- Random presentations of the CS implies that the US has the same probability of occurrence in the presence and absence of the CS.
- Thus, there will be some CS+ trials, but also many CS- trials and US-only trials.
- Is learned irrelevance equal to the sum of LI and the US-preexposure effect?

Does learned irrelevance occur when LI and the US-preexposure effect are eliminated?

Group	Phase 1: Preexposure	Phase 2: Conditioning
-/- (nothing)	HC	T+
T/+ (random)	T / +	T+
TC/L+ (both)	T→C / L+	T+
TC/+ (LI)	T→C / +	T+
T/L+ (US preexp)	T / L+	T+

- +: shock
- T, C, L: tone, click, light CSs
- Dep. var.: suppression ratio
- Baseline: lever pressing for food
- No context manipulation

