Appendix

TABLE 1: Theoretical Model: Definition of Focal Constructs and their Relations

ID	In Vast?	Function in theory	Cited from paper / adjustments /	Reference/ page	relationship	comment
A	yes	Names exposure	"Repeated confrontation with feared stimuli or contexts (e.g., objects, situations, interoceptive stimuli, or fear memories) that are associated with an anticipated threat."	Pittig et al., 2023, p.200	n	
A1		Names threat occurence	Presence of the feared threat	Added by Julia	n	Determination of what is implicitly assumed in the theory
B		Development of Expectancies	In humans, threat associations entail expectancies about the occurrence of the perceived threat	Pittig et al., 2023, p.200	c	
C0	yes	Names Association	Link between feared stimulus and threat, that entails expectancies about the occurrence of threat	Pittig et al., 2023, p.200	n	Abduction of A and B
C	yes	Names Threat expectancy	anticipation of threat, induced by the anxiety-provoking associated stimuli	Added by Julia Derived from statements A and C	n	The definition of threat expectancy is not specified by the theory, but implicitly described in statements A and B
C1	yes	Names initial Threat Expectancy	Threat expectancy before the exposure	Added by Julia Derived from statement F	n	The distinction is assumed by statement F
C2	yes	Names Adjusted threat expectancy	Threat expectancy after the exposure		n	

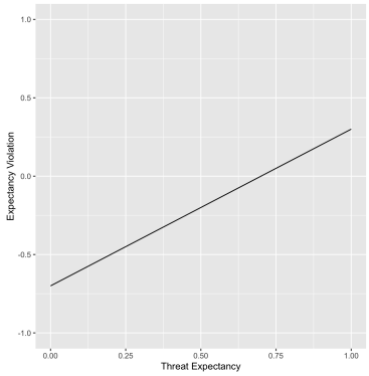
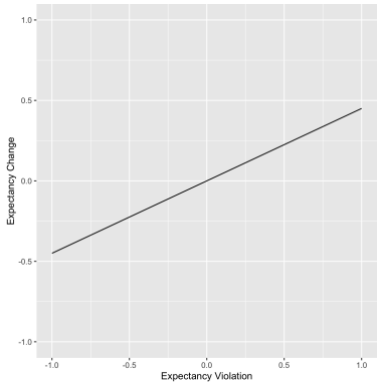
D	yes	Names Expectancy-violation (EV)	"Mismatch between this threat expectancy and the actual occurrence." *to implement the distinction between the initial and the adjusted expectation in the definition and specify, which expectancy is violated:* Mismatch between the *initial* threat expectancy and the actual occurrence of threat	Pittig et al., 2023, p.200	n	
E	yes	Names Expectancy-change (EC)	"Difference between original and adjusted expectancy after exposure" *to specify, that the process of expectancy being changed through exposure can be repeated several times:* Difference between *initial* and adjusted expectancy after exposure	Pittig et al., 2023, p.199	n	
F	yes	Relation EV and EC	"EV does not necessarily result in EC"	Pittig et al., 2023, p.201	c	
G	yes	Names Learning rate	"The individual extent to which EV is transferred into EC"	Pittig et al., 2023, p.201	n	
H	yes	Relation EC and Threat Expectancy	The change in expectancy is added to the initial threat expectancy of the next exposure-iteration	Nochmal nachschauen	C or r?	

TABLE 2 : Formal Model: Variables, Scale level, Range, Theoretical anchors

Construct	**Scale level**	**Range**	**Unit**	**Anchors**
Threat Expectancy	continuous	[0;1]	Threat-units	0 = no threat anticipated 1 = maximum threat anticipated
Threat Occurence	continuous	[0;1]	Threat-units	0 = no threat occurs 1 = maximum threat occurs

Expectancy Violation	continuous	[-1;1]	Threat-units	-1 = no threat anticipated, maximum threat occurs 0 = expectancy equals occurence 1 = maximum threat anticipated; no threat occurs
Learn Rate (α)	continuous	[0;1]	-	0 = adjusted expectancy equals initial expectancy, independent of EV = EC is zero, independent of EV 1 = adjusted expectancy equals initial expectancy minus expectancy violation = EC equals EV
Expectancy Change	continuous	[-1;1]	Threat-units	-1 = adjusted threat expectancy: maximum threat anticipated, initial threat expectancy: no threat anticipated 0 = adjusted threat expectancy: no threat anticipated, initial threat expectancy: no threat anticipated 1 = adjusted threat expectancy: no threat anticipated, initial threat expectancy: maximum threat anticipated

TABLE 3: Functional Relationships

		Considerations	function	Plot of functional relationship
c(D)	EV = f(Threat Expectancy, Threat occurence)	• If threat expectancy equals threat-occurrence, there is no EV • EV is maximum positive (1), if threat expectancy is maximum (1) and threat occurrence is minimum (0) • EV is maximum negative (-1), if threat expectancy is minimum (0) and threat occurrence is maximum (1)	EV = Threat Expectancy – Threat Occurrence	 Threat Occurrence = 0.7 (as in the simulation)
c(G)	EC = f(EV, α)	• Pittig et al. (2023) computed α by estimating it "as free parameter via maximum likelihood estimation", using the following formula: Adjusted Expectancy = Threat Expectancy + α × (Threat Occurrence − Threat Expectancy) Adjusted expectancy was represented by a Gaussian likelihood distribution, using the predicted value of the person`s adjusted expectancy as mean. • The aim of formalizing the theory is to simulate a sample and vary α, to	EC = α × EV	 a = 0.45

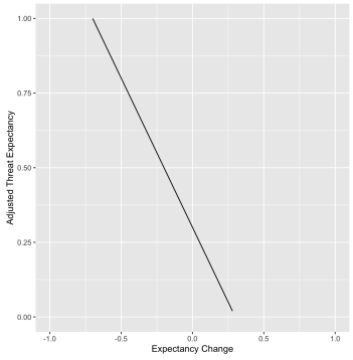
		illustrate the influence of α on Threat Expectancy Change. Therefore, calculating α under a given adjusted Threat Expectancy, as Pittig et al. do, does not contribute to the aim of the formalization. • α will be drawn randomly from a normal-like distribution realizing in values between 0 and 1. α determines, to which extent EV leads to a change in Threat expectancy. • If α is 1, the Expectancy-violation is completely transformed into Expectancy change. The smaller α, the smaller the proportion that goes from EV to EC. • If α is 0, the Expectancy does not change, thus EC=0		
c(H)	Threat expectancy = f(EC)	• The Expectancy change is added to Threat Expectancy • If EC is maximum positive (if the anticipated threat was maximum (1) and no threat occurs (0)), the adjusted / the new initial Threat Expectancy is 0 • If there is no Expectancy Change, the adjusted / the new initial Threat Expectancy equals the former initial Threat Expectancy	$\text{Threat Expectancy}_{i+1} = \text{Threat Expectancy}_{i} - EC$	 Threat Expectancy = 0.3

TABLE 4: Person Parameters for the Simulation

Person Parameter	**Considerations**	**Chosen Distribution for virtual participants**
a	The learning rate is described to be an individual parameter. Based on the results of Pittig et al. (2022), I choose a beta distribution that is slightly flatter than the normal distribution, which I derive from my visual impression. Based on the results, I choose a mean value of 0.7.	~ beta(a = 8.7, b = 3.5)
Threat_expectancy	Based on the results by Pittig et al. (2022), I assume a beta function that is similar in shape to a normal distribution and has a mean value of 0.5	~ beta(a = 3.5, b = 3.5)