



## UvA-DARE (Digital Academic Repository)

### Plasticity of fear memory: a search for relapse prevention

Eftting, M.

**Publication date**  
2011

[Link to publication](#)

#### **Citation for published version (APA):**

Eftting, M. (2011). *Plasticity of fear memory: a search for relapse prevention*.

#### **General rights**

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

#### **Disclaimer/Complaints regulations**

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

## References



- Aitken, M. R. F., Larkin, M. J. W., & Dickinson, A. (2001). Re-examination of the role of within-compound associations in the retrospective reevaluation of causal judgements. *Quarterly Journal of Experimental Psychology*, *54B*, 27-51.
- Alvarez, R. P., Johnson, L., & Grillon, C. (2007). Contextual-specificity of short-delay extinction in humans: Renewal of fear-potentiated startle in a virtual environment. *Learning & Memory*, *14*, 247-253.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Arcediano, F., Ortega, N., & Matute, H. (1996). A behavioural preparation for the study of human Pavlovian conditioning. *Quarterly Journal of Experimental Psychology*, *49B+*, 270-283.
- Arntz, A., Tiesema, M., & Kindt, M. (2007). Treatment of PTSD: A comparison of imaginal exposure with and without imagery rescripting. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 345-370.
- Baeyens, F., & Clarysse, J. (1998). Martians for Windows™95 [Computer Program]. Leuven, Belgium: University of Leuven.
- Baeyens, F., Vansteenwegen, D., Hermans, D., Vervliet, B., & Eelen, P. (2001). Sequential and simultaneous feature positive discriminations: Occasion setting and configural learning in human Pavlovian conditioning. *Journal of Experimental Psychology: Animal Behavior Processes*, *27*, 279-295.
- Balsam, P. D., & Tomie, A. (1985). *Context and learning*. Hillsdale, NJ: Erlbaum.
- Bonardi, C. (1998). Conditional learning: An associative analysis. In N. A. Schmajuk & P. C. Holland (Eds.), *Occasion setting: Associative learning and cognition in animals* (pp. 37-67). Washington, DC: American Psychological Association.
- Bonardi, C., Honey, R. C., & Hall, G. (1990). Context specificity of conditioning in flavor-aversion learning: Extinction and blocking tests. *Animal Learning & Behavior*, *18*, 229-237.
- Bouton, M. E. (1988). Context and ambiguity in the extinction of emotional learning: Implications for exposure therapy. *Behaviour Research and Therapy*, *26*, 137-149.
- Bouton, M. E. (1993). Context, time, and memory retrieval in the interference paradigms of Pavlovian learning. *Psychological Bulletin*, *114*, 80-99.
- Bouton, M. E. (1994a). Conditioning, remembering, and forgetting. *Journal of Experimental Psychology: Animal Behavior Processes*, *20*, 219-231.
- Bouton, M. E. (1994b). Context, ambiguity, and classical conditioning. *Current Directions in Psychological Science*, *3*, 49-53.
- Bouton, M. E. (2000). A learning theory perspective on lapse, relapse, and the maintenance of behavior change. *Health Psychology*, *19*, 57-63.
- Bouton, M. E. (2002). Context, ambiguity, and unlearning: Sources of relapse after behavioral extinction. *Biological Psychiatry*, *52*, 976-986.
- Bouton, M. E. (2004). Context and behavioral processes in extinction. *Learning & Memory*, *11*, 485-494.

## References

- Bouton, M. E., & Bolles, R. C. (1979). Contextual control of the extinction of conditioned fear. *Learning and Motivation, 10*, 445-466.
- Bouton, M. E., & Brooks, D. C. (1993). Time and context effects on performance in a Pavlovian discrimination reversal. *Journal of Experimental Psychology: Animal Behavior Processes, 19*, 165-179.
- Bouton, M. E., García-Gutiérrez, A., Zilski, J., & Moody, E. W. (2006). Extinction in multiple contexts does not necessarily make extinction less vulnerable to relapse. *Behaviour Research and Therapy, 44*, 983-994.
- Bouton, M. E., & King, D. A. (1983). Contextual control of the extinction of conditioned fear: Tests for the associative value of the context. *Journal of Experimental Psychology: Animal Behavior Processes, 9*, 248-265.
- Bouton, M. E., & Moody, E. W. (2004). Memory processes in classical conditioning. *Neuroscience and Biobehavioral Reviews, 28*, 663-674.
- Bouton, M. E., & Nelson, J. B. (1994). Context-specificity of target versus feature inhibition in a feature-negative discrimination. *Journal of Experimental Psychology: Animal Behavior Processes, 20*, 51-65.
- Bouton, M. E., & Nelson, J. B. (1998). Mechanisms of feature-positive and feature-negative discrimination learning in an appetitive conditioning paradigm. In N. A. Schmajuk & P. C. Holland (Eds.), *Occasion setting: Associative learning and cognition in animals* (pp. 69-112). Washington, DC: American Psychological Association.
- Bouton, M. E., & Peck, C. A. (1989). Context effects on conditioning, extinction, and reinstatement in an appetitive conditioning preparation. *Animal Learning & Behavior, 17*, 188-198.
- Bouton, M. E., & Ricker, S. T. (1994). Renewal of extinguished responding in a second context. *Animal Learning & Behavior, 22*, 317-324.
- Bouton, M. E., & Swartzentruber, D. (1986). Analysis of the associative and occasion-setting properties of contexts participating in a Pavlovian discrimination. *Journal of Experimental Psychology: Animal Behavior Processes, 12*, 333-350.
- Bouton, M. E., & Swartzentruber, D. (1989). Slow reacquisition following extinction: Context, encoding, and retrieval mechanisms. *Journal of Experimental Psychology: Animal Behavior Processes, 15*, 43-53.
- Bouton, M. E., Vurbic, D., & Woods, A. M. (2008). D-cycloserine facilitates context-specific fear extinction learning. *Neurobiology of Learning and Memory, 90*, 504-510.
- Bouton, M. E., Woods, A. M., Moody, E. W., Sunsay, C., & García-Gutiérrez, A. (2006). Counteracting the context-dependence of extinction: Relapse and tests of some relapse prevention methods. In M. G. Craske, D. Hermans, & D. Vansteenwegen (Eds.), *Fear and learning: From basic processes to clinical implications* (pp. 175-196). Washington, DC: American Psychological Association.

- Bouton, M. E., Woods, A. M., & Pineño, O. (2004). Occasional reinforced trials during extinction can slow the rate of rapid reacquisition. *Learning and Motivation, 35*, 371-390.
- Brooks, D. C., & Bouton, M. E. (1994). A retrieval cue for extinction attenuates response recovery (renewal) caused by a return to the conditioning context. *Journal of Experimental Psychology: Animal Behavior Processes, 20*, 366-379.
- Chelonis, J. J., Calton, J. L., Hart, J. A., & Schachtman, T. R. (1999). Attenuation of the renewal effect by extinction in multiple contexts. *Learning and Motivation, 30*, 1-14.
- Cheng, P. W., & Holyoak, K. J. (1995). Complex adaptive systems as intuitive statisticians: Causality, contingency, and prediction. In J. A. Meyer & H. Roitblat (Eds.), *Comparative approaches to cognition* (pp. 271-302). Cambridge, MA: MIT Press.
- Christianson, S.-A. (1992). Emotional stress and eyewitness memory: A critical review. *Psychological Bulletin, 112*, 284-309.
- Clark, D. M., Salkovskis, P., Öst, L.-G., Breiholtz, E., Koehler, K. A., Westling, B. E., et al. (2007). Misinterpretation of body sensations in panic disorder. *Journal of Consulting and Clinical Psychology, 65*, 203-213.
- Cole, R. P., Barnet, R. C., & Miller, R. R. (1995). Temporal encoding in trace conditioning. *Animal Learning & Behavior, 23*, 144-153.
- Craske, M. G. (1999). *Anxiety disorders: Psychological approaches to theory and treatment*. Boulder, CO: Westview Press.
- Craske, M. G., Kircanski, K., Zelikowsky, M., Mystkowski, J., Chowdhury, N., & Baker, A. (2008). Optimizing inhibitory learning during exposure therapy. *Behaviour Research and Therapy, 46*, 5-27.
- Dawson, M. E., Schell, A. M., & Filion, D. L. (2000). The electrodermal system. In J. T. Cacioppo, L. G. Tassinary, & G. G. Bernston (Eds.), *Handbook of psychophysiology* (2nd ed., pp. 200-223). New York: Cambridge University Press.
- De Houwer, J., & Beckers, T. (2002). A review of recent developments in research and theories on human contingency learning. *Quarterly Journal of Experimental Psychology, 55B*, 289-310.
- Deacon, B. J., & Arbramowitz, J. S. (2004). Cognitive and behavioral treatments for anxiety disorders: A review of meta-analytic findings. *Journal of Clinical Psychology, 60*, 429-441.
- Denniston, J. C., Chang, R. C., & Miller, R. R. (2003). Massive extinction treatment attenuates the renewal effect. *Learning and Motivation, 34*, 68-86.
- Dickinson, A., & Burke, J. (1996). Within-compound associations mediate the retrospective revaluation of causality judgements. *Quarterly Journal of Experimental Psychology, 49B*, 60-80.
- Dirikx, T., Hermans, D., Vansteenwegen, D., Baeyens, F., & Eelen, P. (2007). Reinstatement of conditioned responses in human differential fear conditioning. *Journal of Behavior Therapy and Experimental Psychiatry, 38*, 237-251.

## References

- Dirikx, T., Vansteenwegen, D., Eelen, P., & Hermans, D. (2009). Non-differential return of fear in humans after a reinstatement procedure. *Acta Psychologica, 130*, 175-182.
- Effting, M., & Kindt, M. (2007). Contextual control of human fear associations in a renewal paradigm. *Behaviour Research and Therapy, 45*, 2002-2018.
- Ehlers, A. (2010). Understanding and treating unwanted trauma memories in Posttraumatic Stress Disorder. *Zeitschrift für Psychologie, 218*, 141-145.
- Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*, 319-345.
- Ehlers, A., Clark, D. M., Hackmann, A., McManus, F., & Fennell, M. (2005). Cognitive therapy for post-traumatic stress disorder: Development and evaluation. *Behaviour Research and Therapy, 43*, 413-431.
- Ehlers, A., Clark, D. M., Hackmann, A., McManus, F., Fennell, M., Herbert, C., et al. (2003). A randomized controlled trial of cognitive therapy, a self-help booklet, and repeated assessments as early interventions for posttraumatic stress disorder. *Archives of General Psychiatry, 60*, 1024-1032.
- Ehlers, A., Hackmann, A., Steil, R., Clohessy, S., Wenninger, K., & Winter, H. (2002). The nature of intrusive memories after trauma: The warning signal hypothesis. *Behaviour Research and Therapy, 40*, 995-1002.
- Eysenck, H. J. (1981). Behavior therapy and the conditioning model of neurosis. *International Journal of Psychology, 16*, 343-370.
- Fanselow, M. S. (1994). Neural organization of the defensive behavior system responsible for fear. *Psychonomic Bulletin and Review, 14*, 429-438.
- Field, A. P. (2005). *Discovering statistics using SPSS* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Fonteyne, R., Vervliet, B., Hermans, D., Baeyens, F., & Vansteenwegen, D. (2009). Reducing chronic anxiety by making the threatening event predictable: An experimental approach. *Behaviour Research and Therapy, 47*, 830-839.
- Fonteyne, R., Vervliet, B., Hermans, D., Baeyens, F., & Vansteenwegen, D. (2010). Exposure to the context and removing the unpredictability of the US: Two methods to reduce contextual anxiety compared. *Biological Psychology, 85*, 361-369.
- Gawronski, B., Rydell, R. J., Vervliet, B., & De Houwer, J. (2010). Generalization versus contextualization in automatic evaluation. *Journal of Experimental Psychology: General, 139*, 683-701.
- Ghirlanda, S. (2005). Retrospective reevaluation as simple associative learning. *Journal of Experimental Psychology: Animal Behavior Processes, 31*, 107-111.
- Goddard, M. J. (1999). Renewal to the signal value of an unconditioned stimulus. *Learning and Motivation, 30*, 15-34.
- Grillon, C., Ameli, R., Woods, S. W., Merikangas, K., & Davis, M. (1991). Fear-potentiated startle in humans: Effects of anticipatory anxiety on the acoustic blink reflex. *Psychophysiology, 28*, 588-595.

- Grillon, C., Cordova, J., Morgan, C. A., Charney, D. S., & Davis, M. (2004). Effects of the beta-blocker propranolol on cued and contextual fear conditioning in humans. *Psychopharmacology*, *175*, 342-352.
- Gunther, L. M., Denniston, J. C., & Miller, R. R. (1998). Conducting exposure treatment in multiple contexts can prevent relapse. *Behaviour Research and Therapy*, *36*, 75-91.
- Hamm, A. O., & Vaitl, D. (1996). Affective learning: Awareness and aversion. *Psychophysiology*, *33*, 698-710.
- Harris, J. A., Jones, M. L., Bailey, G. K., & Westbrook, R. F. (2000). Contextual control over conditioned responding in an extinction paradigm. *Journal of Experimental Psychology: Animal Behavior Processes*, *26*, 174-185.
- Hartley, C. A., & Phelps, E. A. (2010). Changing fear: The neurocircuitry of emotion regulation. *Neuropsychopharmacology*, *35*, 136-146.
- Hermans, D., Dirikx, T., Vansteenwegen, D., Baeyens, F., Van den Bergh, O., & Eelen, P. (2005). Reinstatement of fear responses in human aversive conditioning. *Behaviour Research and Therapy*, *43*, 533-551.
- Hobin, J. A., Goosens, K. A., & Maren, S. (2003). Context-dependent neuronal activity in the lateral amygdala represents fear memories after extinction. *Journal of Neuroscience*, *23*, 8410-8416.
- Hoffman, S. G., Meuret, A. E., Smits, J. A. J., Simon, N. M., Pollack, M. H., Eisenmenger, K., et al. (2004). Augmentation of exposure therapy with D-cycloserine for social anxiety disorder. *Archives of General Psychiatry*, *63*, 298-304.
- Holland, P. C. (1986). Temporal determinants of occasion setting in feature-positive discriminations. *Animal Learning & Behavior*, *14*, 111-120.
- Holland, P. C. (1989a). Acquisition and transfer of conditional discrimination performance. *Journal of Experimental Psychology: Animal Behavior Processes*, *15*, 154-165.
- Holland, P. C. (1989b). Feature extinction enhances transfer of occasion setting. *Animal Learning & Behavior*, *17*, 269-279.
- Holland, P. C. (1992). Occasion setting in Pavlovian conditioning. *The Psychology of Learning and Motivation*, *28*, 69-125.
- Holland, P. C., & Bouton, M. E. (1999). Hippocampus and context in classical conditioning. *Current Opinion in Neurobiology*, *9*, 195-202.
- Kalisch, R., Korenfeld, E., Stephen, K. E., Weiskopf, N., Seymour, B., & Dolan, R. J. (2006). Context-dependent human extinction memory is mediated by a ventromedial prefrontal and hippocampal network. *Journal of Neuroscience*, *26*, 9503-9511.
- Kindt, M., Soeter, M., & Vervliet, B. (2009). Beyond extinction: Erasing human fear responses and preventing the return of fear. *Nature Neuroscience*, *12*, 256-258.
- Lamoureux, J. A., Buhusi, C. V., & Schmajuk, N. A. (1998). A real-time theory of Pavlovian conditioning: Simple stimuli and occasion setters. In N. A. Schmajuk & P. C. Holland (Eds.), *Occasion setting: Associative learning and*



## References

- cognition in animals* (pp. 383-424). Washington, DC: American Psychological Association.
- Lang, P. J. (1985). The cognitive psychophysiology of emotion: Fear and anxiety. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp. 131-170). Hillsdale, NJ: Erlbaum.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1990). Emotion, attention, and the startle reflex. *Psychological Review*, *97*, 377-395.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (2005). International Affective Picture System (IAPS): Technical manual and affective ratings. Gainesville, FL: NIMH Centre for the Study of Emotion and Attention, University of Florida.
- Larkin, M. J. W., Aitken, M. R. F., & Dickinson, A. (1998). Retrospective reevaluation of causal judgments under positive and negative contingencies. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *24*, 1331-1352.
- Ledgerwood, L., Richardson, R., & Cranney, J. (2003). Effects of D-cycloserine on extinction of conditioned freezing. *Behavioral Neuroscience*, *117*, 341-349.
- LeDoux, J. E. (1995). Emotion: Clues from the brain. *Annual Review of Psychology*, *46*, 209-235.
- LeDoux, J. E. (2000). Emotion circuits in the brain. *Annual Review of Neuroscience*, *23*, 155-184.
- LeDoux, J. E., Romanski, L., & Xagoraris, A. (1989). Indelibility of subcortical emotional memories. *Journal of Cognitive Neuroscience*, *1*, 238-243.
- LeDoux, J. E., Sakaguchi, A., & Reis, D. J. (1984). Subcortical efferent projections of the medial geniculate-nucleus mediate emotional responses conditioned to acoustic stimuli. *Journal of Neuroscience*, *4*, 683-698.
- Lee, J. L. C. (2009). Reconsolidation: Maintaining memory relevance. *Trends in Neurosciences*, *32*, 413-420.
- León, S. P., Abad, M. J. F., & Rosas, J. M. (2010). Giving contexts informative value makes information context-specific. *Experimental Psychology*, *57*, 46-53.
- Lipp, O. V., Neumann, D. L., & Mason, V. (2001). Stimulus competition in affective and relational learning. *Learning and Motivation*, *32*, 306-331.
- Lovibond, P. F. (2003). Causal beliefs and conditioned responses: Retrospective reevaluation induced by experience and by instruction. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *29*, 97-106.
- Lovibond, P. F., Davis, N. R., & O'Flaherty, A. S. (2000). Protection from extinction in human fear conditioning. *Behaviour Research and Therapy*, *38*, 967-983.
- Lovibond, P. F., Preston, G. C., & Mackintosh, N. J. (1984). Context specificity of conditioning, extinction, and latent inhibition. *Journal of Experimental Psychology: Animal Behavior Processes*, *10*, 360-375.
- Lovibond, P. F., & Shanks, D. R. (2002). The role of awareness in Pavlovian conditioning: Empirical evidence and theoretical implications. *Journal of Experimental Psychology: Animal Behavior Processes*, *28*, 3-26.

- Lykken, D., & Venables, P. H. (1971). Direct measurement of skin conductance: A proposal for standardization. *Psychophysiology*, *8*, 656-672.
- Marks, I. M. (1978). Behavioral psychotherapy of adult neurosis. In S. L. Garfield & A. E. Bergin (Eds.), *Handbook of psychotherapy and behavior change: An empirical analysis* (pp. 493-589). New York: Wiley.
- McGaugh, J. L. (1966). Time-dependent processes in memory storage. *Science*, *153*, 1351-1358.
- Melchers, K. G., Lachnit, H., & Shanks, D. R. (2004). Within-compound associations in retrospective revaluation and in direct learning: A challenge for comparator theory. *Quarterly Journal of Experimental Psychology*, *57B*, 25-53.
- Milad, M. R., Orr, S. P., Pitman, R. K., & Rauch, S. L. (2005). Context modulation of memory for fear extinction in humans. *Psychophysiology*, *42*, 456-464.
- Milad, M. R., Quinn, B. T., Pitman, R. K., Orr, S. P., Fischl, B., & Rauch, S. L. (2005). Thickness of ventromedial prefrontal cortex in humans is correlated with extinction memory. *Proceedings of the National Academy of Sciences of the United States of America*, *102*, 10706-10711.
- Miller, R. R., & Barnet, R. C. (1993). The role of time in elementary associations. *Current Directions in Psychological Science*, *2*, 106-111.
- Miller, R. R., & Matzel, L. D. (1988). The comparator hypothesis: A response rule for the expression of associations. In G. H. Bower (Ed.), *The psychology of learning and motivation, Vol. 22: Advances in research and theory* (pp. 51-92). San Diego, CA: Academic Press.
- Mineka, S., Mystkowski, J. L., Hladek, D., & Rodriguez, B. I. (1999). The effects of changing contexts on return of fear following exposure therapy for spider fear. *Journal of Consulting and Clinical Psychology*, *67*, 599-604.
- Mineka, S., & Zinbarg, R. E. (2006). A contemporary learning theory perspective on the etiology of anxiety disorders. *American Psychologist*, *61*, 10-26.
- Mitchell, C. J., De Houwer, J., & Lovibond, P. F. (2009). The propositional nature of human associative learning. *Behavioral and Brain Sciences*, *32*, 183-198.
- Mowrer, O. H. (1939). A stimulus-response analysis of anxiety and its role as a reinforcing agent. *Psychological Review*, *46*, 553-565.
- Mystkowski, J. L., Craske, M. G., & Echiverri, A. M. (2002). Treatment context and return of fear in spider phobia. *Behavior Therapy*, *33*, 399-416.
- Mystkowski, J. L., Mineka, S., Vernon, L. L., & Zinbarg, R. E. (2003). Changes in caffeine states enhance return of fear in spider phobia. *Journal of Consulting and Clinical Psychology*, *71*, 243-250.
- Nader, K. (2003). Memory traces unbound. *Trends in Neurosciences*, *26*, 65-72.
- Nader, K., Schafe, G. E., & LeDoux, J. E. (2000). Fear memories require protein synthesis in the amygdala for reconsolidation after retrieval. *Nature*, *406*, 722-726.
- Nelson, J. B. (2002). Context specificity of excitation and inhibition in ambiguous stimuli. *Learning and Motivation*, *33*, 284-310.

## References

- Neumann, D. L. (2006). The effects of physical context changes and multiple extinction contexts on two forms of renewal in a conditioned suppression task with humans. *Learning and Motivation, 37*, 149-175.
- Neumann, D. L. (2007). The resistance of renewal to instructions to devalue the role of contextual cues in a conditioned suppression task with humans. *Learning and Motivation, 38*, 105-127.
- Neumann, D. L., & Kitlertsirivatana, E. (2010). Exposure to a novel context after extinction causes a renewal of extinguished conditioned responses: Implications for the treatment of fear. *Behaviour Research and Therapy, 48*, 565-570.
- Neumann, D. L., Lipp, O. V., & Cory, S. E. (2007). Conducting extinction in multiple contexts does not necessarily attenuate the renewal of shock expectancy in a fear-conditioning procedure with humans. *Behaviour Research and Therapy, 45*, 385-394.
- Norrholm, S. D., Jovanovic, T., Vervliet, B., Myers, K. M., Davis, M., Rothbaum, B. O., et al. (2006). Conditioned fear extinction and reinstatement in a human fear-potentiated startle paradigm. *Learning & Memory, 13*, 681-685.
- Öst, L.-G. (1997). Rapid treatment of specific phobias. In G. C. L. Davey (Ed.), *Phobias: A handbook of theory, research and treatment* (pp. 227-246). Chichester, England: Wiley.
- Paredes-Olay, M. C., & Rosas, J. M. (1999). Within-subjects extinction and renewal in predictive judgments. *Psicológica, 20*, 195-210.
- Pavlov, I. (1927). *Conditioned Reflexes*. London: Oxford University Press.
- Pearce, J. M. (1987). A model for stimulus generalization in Pavlovian conditioning. *Psychological Review, 87*, 532-552.
- Pearce, J. M., & Hall, G. (1980). A model for Pavlovian learning: Variations in the effectiveness of conditioned but not of unconditioned stimuli. *Psychological Review, 87*, 532-552.
- Pohlack, S., Liebscher, C., Ridder, S., Lipinski, S., & Flor, H. (2009). The role of hippocampus and context conditioning in posttraumatic stress disorder: A cross-sectional study in traumatized and non-traumatized paramedics. *Psychophysiology, 46*(S1), 126.
- Prokasy, W. F., & Kumpfer, K. L. (1973). Classical conditioning. In W. F. Prokasy & D. C. Raskin (Eds.), *Electrodermal activity in psychological research* (pp. 157-202). New York: Academic Press.
- Quirk, G. J., & Mueller, D. (2008). Neural mechanisms of extinction. *Neuropsychopharmacology, 33*, 56-72.
- Rachman, S. (1977). The conditioning theory of fear acquisition: A critical examination. *Behaviour Research and Therapy, 15*, 375-387.
- Rachman, S. (1989). The return of fear: Review and prospect. *Clinical Psychology Review, 9*, 147-168.
- Rauhut, A. S., Thomas, B. L., & Ayres, J. J. B. (2001). Treatments that weaken Pavlovian conditioned fear and thwart its renewal in rats: Implications for

- treating human phobias. *Journal of Experimental Psychology: Animal Behavior Processes*, 27, 99-114.
- Rescorla, R. A. (1985). Conditioned inhibition and facilitation. In R. R. Miller & N. E. Spear (Eds.), *Information processing in animals: Conditioned inhibition* (pp. 299-326). Hillsdale, NJ: Erlbaum.
- Rescorla, R. A. (2001). Experimental extinction. In R. R. Mowrer & S. B. Klein (Eds.), *Handbook of contemporary learning theories* (pp. 119-154). Mahwah, NJ: Erlbaum.
- Rescorla, R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A. H. Black & W. F. Prokasy (Eds.), *Classical conditioning II: Current research and theory* (pp. 64-99). New York: Appleton-Century-Crofts.
- Ressler, K. J., Rothbaum, B. O., Tannenbaum, L., Anderson, P., Graap, K., Zimand, E., et al. (2004). Cognitive enhancers as adjuncts to psychotherapy: Use of D-cycloserine in phobic individuals to facilitate extinction of fear. *Archives of General Psychiatry*, 61, 1136-1144.
- Rosas, J. M., & Callejas-Aguilera, J. E. (2006). Context switch effects on acquisition and extinction in human predictive learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 32, 461-474.
- Rosas, J. M., García-Gutiérrez, A., & Callejas-Aguilera, J. E. (2006). Effects of context change upon retrieval of first and second-learned information in human predictive learning. *Psicológica*, 27, 35-56.
- Rosen, J. B., & Schulkin, J. (1998). From normal fear to pathological anxiety. *Psychological Review*, 105, 325-350.
- Rosenthal, R., & Rosnow, R. L. (1985). *Contrast analysis: Focused comparisons in the analysis of variance*. Cambridge: Cambridge University Press.
- Ross, R. T., & Holland, P. C. (1981). Conditioning of simultaneous and serial feature-positive discriminations. *Animal Learning & Behavior*, 9, 293-303.
- Rowe, M. K., & Craske, M. G. (1998). Effects of varied-stimulus exposure training on fear reduction and return of fear. *Behaviour Research and Therapy*, 36, 719-734.
- Rudy, J. W., Huff, N. C., & Matus-Amat, P. (2004). Understanding contextual fear conditioning: Insights from a two-process model. *Neuroscience and Biobehavioral Reviews*, 28, 675-685.
- Rudy, J. W., & O'Reilly, R. C. (2001). Conjunctive representations, the hippocampus, and contextual fear conditioning. *Cognitive, Affective, & Behavioral Neuroscience*, 1, 66-82.
- Sara, S. J. (2000). Retrieval and reconsolidation: Toward a neurobiology of remembering. *Learning & Memory*, 7, 73-84.
- Schiller, D., Monfils, M.-H., Raio, C. M., Johnson, D. C., LeDoux, J. E., & Phelps, E. A. (2010). Preventing the return of fear in humans using reconsolidation update mechanisms. *Nature*, 463, 49-53.
- Schmajuk, N. A., Lamoureux, J. A., & Holland, P. C. (1998). Occasion setting: A neural network approach. *Psychological Review*, 105, 3-32.

## References

- Seligman, M. E. (1968). Chronic fear produced by unpredictable electric shock. *Journal of Comparative and Physiological Psychology*, *66*, 402-411.
- Sevenster, D., Beckers, T., & Kindt, M. (submitted). Reconsolidation of human fear memory depends on the informational value of reactivation.
- Shanks, D. R. (1985). Forward and backward blocking in human contingency judgement. *Quarterly Journal of Experimental Psychology*, *37B*, 1-21.
- Shanks, D. R., & Darby, R. J. (1998). Feature- and rule-based generalization in human associative learning. *Journal of Experimental Psychology: Animal Behavior Processes*, *24*, 405-415.
- Soeter, M., & Kindt, M. (2010). Dissociating response systems: Erasing fear from memory. *Neurobiology of Learning and Memory*, *94*, 30-41.
- Sotres-Bayon, F., Bush, D. E. A., & LeDoux, J. E. (2004). Emotional perseveration: An update on prefrontal-amygdala interactions in fear extinction. *Learning & Memory*, *11*, 525-535.
- Swartzentruber, D. (1991). Blocking between occasion setters and contextual stimuli. *Journal of Experimental Psychology: Animal Behavior Processes*, *17*, 163-173.
- Swartzentruber, D. (1995). Modulatory mechanisms in Pavlovian conditioning. *Animal Learning & Behavior*, *23*, 123-143.
- Swartzentruber, D., & Bouton, M. E. (1992). Context sensitivity of conditioned suppression following preexposure to the conditioned stimulus. *Animal Learning & Behavior*, *20*, 97-103.
- Tamai, N., & Nakajima, S. (2000). Renewal of formerly conditioned fear in rats after extensive extinction training. *International Journal of Comparative Psychology*, *13*, 137-146.
- Thomas, B. L., Larsen, N., & Ayres, J. J. B. (2003). Role of context similarity in ABA, ABC, and AAB renewal paradigms: Implications for theories of renewal and for treating human phobias. *Learning and Motivation*, *34*, 410-436.
- Thomas, B. L., Longo, C. L., & Ayres, J. J. B. (2005). Thwarting the renewal (relapse) of conditioned fear with the explicitly unpaired procedure: Possible interpretations and implications for treating human fears and phobias. *Learning and Motivation*, *36*, 374-407.
- Thomas, B. L., Vurbic, D., & Novak, C. (2009). Extensive extinction in multiple contexts eliminates the renewal of conditioned fear in rats. *Learning and Motivation*, *40*, 147-159.
- Urushihara, K., & Miller, R. R. (2010). Backward blocking in first-order conditioning. *Journal of Experimental Psychology: Animal Behavior Processes*, *36*, 281-295.
- Van Hamme, L. J., & Wasserman, E. A. (1994). Cue competition in causality judgments: The role of nonpresentation of compound stimulus elements. *Learning and Motivation*, *25*, 127-151.
- Vansteenwegen, D., Hermans, D., Vervliet, B., Francken, G., Beckers, T., Baeyens, F., et al. (2005). Return of fear in a human differential conditioning paradigm caused by a return to the original acquisition context. *Behaviour Research and Therapy*, *43*, 323-336.

- Vansteenwegen, D., Vervliet, B., Hermans, D., Beckers, T., Baeyens, F., & Eelen, P. (2006). Stronger renewal in human fear conditioning when tested with an acquisition retrieval cue than with an extinction retrieval cue. *Behaviour Research and Therapy*, *44*, 1717-1725.
- Vansteenwegen, D., Vervliet, B., Iberico, C., Baeyens, F., Van den Bergh, O., & Hermans, D. (2007). The repeated confrontation with videotapes of spiders in multiple contexts attenuates renewal of fear in spider-anxious students. *Behaviour Research and Therapy*, *45*, 1169-1179.
- Vervliet, B., Vansteenwegen, D., Baeyens, F., Hermans, D., & Eelen, P. (2005). Return of fear in a human differential conditioning paradigm caused by a stimulus change after extinction. *Behaviour Research and Therapy*, *43*, 357-371.
- Walker, D. L., Ressler, K. J., Lu, K. T., & Davis, M. (2002). Facilitation of conditioned fear extinction by systemic administration or intra-amygdala infusions of D-cycloserine as assessed with fear-potentiated startle in rats. *Journal of Neuroscience*, *22*, 2343-2351.
- Wasserman, E. A., & Berglan, L. R. (1998). Backward blocking and recovery from overshadowing in human causal judgement: The role of within-compound associations. *Quarterly Journal of Experimental Psychology*, *51B*, 121-138.
- Watson, J. B., & Rayner, R. (1920). Conditioned emotional reactions. *Journal of Experimental Psychology*, *3*, 1-14.
- Weike, A. I., Schupp, H. T., & Hamm, A. O. (2007). Fear acquisition requires awareness in trace but not delay conditioning. *Psychophysiology*, *44*, 170-180.
- Wolpe, J. (1968). Psychotherapy by reciprocal inhibition. *Conditional Reflex*, *3*, 234-240.
- Woods, A. M., & Bouton, M. E. (2006). D-Cycloserine facilitates extinction but does not eliminate renewal of the conditioned emotional response. *Behavioral Neuroscience*, *120*, 1159-1162.
- Woods, A. M., & Bouton, M. E. (2007). Occasional reinforced responses during extinction can slow the rate of reacquisition of an operant response. *Learning and Motivation*, *38*, 56-74.