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## 1 The rise of *affectivism*

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63

64 Standfirst:

65 Research over the past decades has demonstrated the explanatory power of emotions,  
66 feelings, motivations, moods, and other affective processes when trying to understand and  
67 predict how we think and behave. In this consensus article, we ask: Has the increasingly  
68 recognized impact of affective phenomena ushered in a new era, the era of *affectivism*?

69

70           The behavioural and cognitive sciences have faced perennial challenges of  
71 incorporating emotions, feelings, motivations, moods, and other affective processes into  
72 models of human behaviour and the human mind. Such processes have long been  
73 marginalised or ignored, typically on the basis that they were irrational, unmeasurable, or  
74 simply unenlightening. However, it has become increasingly difficult to deny that these  
75 processes are not only linked to our well-being, but also that they shape our behaviour and  
76 drive key cognitive mechanisms such as attention, learning, memory, and decision-making.

77           Fertile ground for addressing these challenges lies in the writings of the ancient Greeks,  
78 and of eminent scholars such as Descartes, Hume, Darwin, Wundt and James, to name but a  
79 few. The most recent seeds were sown in the 1960s, allowing an unprecedented,  
80 multidisciplinary interest in affective processes to take root around twenty years later.  
81 Research on such processes has positively blossomed since, as growing numbers of dedicated  
82 researchers, departments, research centres, journals and societies contribute to the affective  
83 sciences – a highly integrative endeavour that spans disciplines, methods, and theories.<sup>1-4</sup> By  
84 reaping the fruits of these cumulative advances, we are now able to understand and account  
85 for more of the variability in the available data and formulate more powerful and precise  
86 predictions as a consequence. Indeed, so profound have the repercussions for our shared  
87 models of human behaviour become that we can now ask whether we have moved beyond the  
88 eras of behaviourism and cognitivism, into the era of *affectivism*.

### 89 **Characterizing *affectivism***

90           One of the leaders of the “cognitive (r)evolution” described how “behavio[u]rism faded  
91 because of its failure to solve basic questions about human thought and action”.<sup>5</sup> Indeed,  
92 although elements of behaviourism continued to influence cognitivist thinking, cognitivism  
93 represented a rejection of some of the central tenets of behaviourism. But the affective  
94 sciences supplement cognitivism rather than supplant it. In fact, if cognitivism is conceived

95 of as an approach in which the inclusion of cognitive processes in models of behaviour, mind  
96 and brain increases the power to explain not only cognitive phenomena but also behaviour,  
97 then *affectivism* would be the approach in which the inclusion of affective processes in such  
98 models not only explains affective phenomena but, critically, further enhances the power to  
99 explain cognition and behaviour (Figure 1a).

100         The definition of affective processes, either as a whole or individually, is subject to  
101 debate. For example, questions continue concerning how definitions of emotion should  
102 accommodate the fact that we continuously evaluate events around us and the way in which  
103 our central and peripheral nervous systems allow the emergence of expressions, physiological  
104 arousal and bodily reactions, action tendencies and felt subjective experiences. Nonetheless,  
105 it seems that affective processes are typically understood to relate to the notion of  
106 (dis)pleasure or valence, to not necessarily be consciously felt, and to mobilize the organism  
107 to deal with events that may be important to that organism. In any case, scientific study is  
108 beset by questions of terminology: Persistent difficulties in formally defining ‘cognition’<sup>6</sup> did  
109 not prevent the transition from behaviourism to cognitivism, and the fact that there is no  
110 consensus concerning a formal definition of other important constructs such as intelligence,  
111 religion, culture and even life does not preclude fruitful scientific study of them.

112         Indeed, in spite of these questions of definition of some of its core phenomena, the  
113 affective sciences have already led to a better understanding of how we acquire knowledge of  
114 the objects, concepts and people around us, and how we determine the value of those things.  
115 Importantly, emotions do not just shape how we interpret the world, but also shape which  
116 aspects of the world need our attention and which can safely be ignored: Emotions are not  
117 just about what *is*, but also about what *matters*.

118         **Developing affective sciences**

119           The recent and transformative influence of the affective sciences on scholarly discourse  
120 about human mind and behaviour is apparent in the evolution of funding (Figure 1b) and  
121 publications (Figure 1c), even in areas related to central cognitive mechanisms - e.g.,  
122 memory, attention, perception, and decision-making (Figures 1d-1g). Particularly in  
123 psychology since the 1980s, the tight relationship between affect, cognition and behaviour  
124 has been revealed in ongoing research topics such as emotional intelligence, emotion  
125 regulation, addiction, decision making and social interaction. But several other disciplines  
126 also began paying increasing attention to affective phenomena around the same time, and the  
127 burgeoning interest continues.

128           One key example is *affective neuroscience*. While the term itself emerged only in the  
129 1990s, previous ground-breaking studies of the emotional brain, in particular of the amygdala  
130 and its role in emotional learning, had set the stage for this field to emerge.<sup>7</sup> Studies began to  
131 reveal the brain circuitry responsible for many affective phenomena in animals and humans,  
132 including threat detection and anxiety reactions, homeostatic feelings and motivations, sexual  
133 and affiliative reactions, reward wanting and liking, and addictions. Innovative studies with  
134 brain-damaged patients highlighted the interdependence of cognitive and affective processes,  
135 the distinction between emotions and feelings, and the essential role of emotions in the  
136 decision-making process. Neuroscientific advances also played a key role in popularising  
137 emotion research for the public at large, as the first functional magnetic resonance imaging  
138 pictures in the 1990s seemed to cement the status of human emotion as an objective,  
139 measurable, and scientifically accessible phenomenon. In terms of the origins of our affective  
140 lives, studies of young children began and continue to highlight the critical role of emotion  
141 and motivation in human development,<sup>8</sup> and advances in *comparative affective science* are  
142 providing new insights into the evolutionary and ethological bases of affective processes in  
143 humans and non-human animals.<sup>9</sup>

144 In the clinical domain, long-established classification models of mental health and  
145 illness based largely on lists of behavioural manifestations and cognitive disturbances have  
146 recently been challenged by a new diagnostic system, proposed by the NIMH, which relies  
147 heavily on emotion-related constructs, including arousal, and positive and negative valence  
148 systems.<sup>10</sup> Similarly, neuropsychological assessment, intervention and rehabilitation after  
149 brain damage or disease have traditionally focused on cognitive functions (e.g., language,  
150 perception, and memory), but have in recent years begun to take affective domains more  
151 seriously, as has the psychotherapeutic treatment of many mental health problems. These  
152 advances represent key shifts in fundamental conceptions of mental well-being, illustrating  
153 how research on affective processes benefits from and influences advances elsewhere.

154 A similar illustration can be found in *affective computing*. Since its launch in the  
155 1990s,<sup>11</sup> the development of artificial intelligence and social robotics has led to specific  
156 computational approaches aimed at implementing emotional processes in artificial agents  
157 (socially interactive agents, social robotics, chatbots) and systems. This trend is particularly  
158 apparent in signal processing research that allows more sensitive measuring and monitoring  
159 of affective responses. Affective computing has powerful implications for industry, social  
160 media and education, and, when combined with clinical research, also for health monitoring  
161 and patient care.

162 There are also key roles for the humanities and the social sciences in the affective  
163 sciences. In recent decades, philosophy has seen emotion, affect, feelings, and related notions  
164 become central explanatory tools, alongside belief and desire, in theories of mind and in  
165 accounts of moral and evaluative thought and behaviour.<sup>12</sup> In the field of history, several  
166 research centres dedicated to emotions have been established in the past decade, mapping  
167 how emotions themselves have been conceptualised and expressed differently over time and



168 across cultures, and highlighting the influence of emotions as determinants of historical  
169 action and thought.<sup>13</sup>

170 Researchers have also begun to pay more attention to affective processes in general  
171 linguistics, analysing, for example, how emotions are referred to in the languages of the  
172 world via the diverse emotion lexica.<sup>14</sup> In terms of cultural comparisons, there are emotion  
173 words that do not seem to have equivalent words in English, such as *amae*, a Japanese  
174 emotion word which means something like desiring to be loved by or dependent on someone.  
175 In linguistic pragmatics, theories of utterance interpretation now explore not only the  
176 expressive qualities of figurative language (metaphor in particular), but also the direct  
177 manifestation of emotions through linguistic and paralinguistic means, effectively embracing  
178 the very same affective dimension that was formerly disregarded.

179 Meanwhile, in the social sciences, behavioural economists have developed more  
180 psychologically realistic assumptions about economic agents - *homo economicus* - by  
181 incorporating affective processes into their theoretical and empirical models of investment  
182 behaviour, medical decision making, bargaining, and issues in political economy such as  
183 voting behaviour. Anthropology, too, has begun to focus on the cultural modelling of human  
184 affective processes, highlighting the intercultural variety of emotion repertoires, while  
185 research in sociology has complemented this approach with a focus on intra-cultural plurality  
186 and the role of emotions in social collectives.<sup>15</sup> Indeed, most anthropologists and sociologists  
187 now recognise the significance of emotions in human behaviour, and study emotional  
188 interactions at the micro-level (between individuals or in small groups), the meso-level  
189 (social institutions), and the macro-level (social structures such as class, age or  
190 gender). Emotions are considered fundamental social phenomena, forming the basis for many  
191 kinds of social activities and interactions, and playing an essential role in socialisation

192 processes, such as affective social learning. Thus, just as cognition and behaviour can serve  
193 both social and non-social functions, so too can affect.

194 The influence of affective sciences is also growing in socially relevant domains,  
195 shaping research and public attention accordingly (Box 1). Other key disciplines in which  
196 emotions and feelings are being taken more seriously as objects of research include the  
197 political sciences, public policy, communication, literature, and the arts.

### 198 **A relevant and timely question**

199 Scientists typically neglect what they cannot measure in order to reduce noise in their  
200 data and better attend to their object of study: Behaviourism neglected the central role of  
201 cognitive and affective processes; cognitivism neglected the role of affective processes.  
202 While the behavioural and the cognitive sciences remain essential to the study of the mind,  
203 brain and behaviour, given that emotions are often held to involve both cognitive aspects  
204 and behavioural tendencies, an era of *affectivism* can be seen as a potential  
205 natural successor to both the behaviourism and cognitivism eras: it would  
206 naturally incorporate both perspectives. In this light, perhaps the growing interest in the  
207 affective sciences stems from the maturation of the scientific study of how and why we think  
208 the way we think and do the things we do.

209 But the relevance of the question of whether or not we are in a new era hinges perhaps  
210 not just on an appreciation of historical scientific progress or of the contribution of the  
211 affective sciences, but also on how cognitive processes are defined: If one assumes that all  
212 mental processes – including affective processes – are captured by the word *cognitive*, then  
213 any blossoming of the affective sciences could be said to be simply part of the further  
214 growth of the cognitive sciences; as such, the question could perhaps seem irrelevant.  
215 Nevertheless, asking it would at the very least constitute a call for our colleagues to consider  
216 advances in the affective sciences in light of their own models and research: considering

217 affective processes in cognitive and behavioural models may well increase the explanatory  
218 and predictive power of such models. Above all, we hope this brief opinion piece might  
219 initiate and stimulate constructive, interdisciplinary, and passionate debate.

220         The conceptual, methodological and technical advances made within the last few  
221 decades have demonstrated that affective processes are unquestionably enlightening when it  
222 comes to understanding both behaviour and cognition. While it will ultimately be the  
223 responsibility of historians of science to determine whether or not a new era has begun,  
224 given the undeniable impact of affective sciences on our models of brain, mind, and  
225 behaviour, it seems relevant to ask today whether we are now in the era of *affectivism*.

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229         Total = 1992 words (with “standfirst”)

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## References

1. Davidson, R.J., Scherer, K.R., & Goldsmith, H.H. (Eds.). *Handbook of affective sciences*. Oxford University Press. (2003).
2. Sander, D., & Scherer, K.R. (Eds.). *The Oxford companion to emotion and the affective sciences*. Oxford University Press. (2009).
3. Dalgleish, T., & Power, M.J. (Eds.). *Handbook of cognition and emotion*. John Wiley & Sons Ltd. (1999).
4. Scarantino, A. (Ed.). *The Routledge handbook of emotion theory*. Routledge. (forthcoming).
5. Mandler, G. Origins of the cognitive (r)evolution. *J. Hist. Behav. Sci.*, **38**, 4, 339-353. <https://doi.org/10.1002/jhbs.10066> (2002), p. 339.
6. Bayne, T., et al. What is cognition? *Curr. Biol.*, **29**(13), R608–R615. <https://doi.org/10.1016/j.cub.2019.05.044> (2019).
7. Armony, J., & Vuilleumier, P. (Eds.). *The Cambridge handbook of human affective neuroscience*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511843716> (2013).
8. Dukes, D., Samson, A.C, & Walle, E. (Eds.). *The Oxford handbook of emotional development*. Oxford University Press. (forthcoming).
9. Kret, M.E., Massen, J., & Bliss-Moreau, E. (Eds.). Special issue: Building a truly comparative affective science. *Neuroscience and Biobehavioral Reviews*. <https://www.sciencedirect.com/journal/neuroscience-and-biobehavioral-reviews/special-issue/10Q4N0GFXM7> (2021).
10. National Institute of Mental Health. Strategic plan for research. <https://www.nimh.nih.gov/about/strategic-planning-reports/index.shtml> (2008).
11. Calvo, R.A., D’Mello, S., Gratch, J., & Kappas, A. (Eds.). *The Oxford handbook of affective computing*. Oxford University Press. (2015).
12. Goldie, P. (Ed.). *The Oxford handbook of philosophy of emotion*. Oxford University Press. (2009).
13. Broomhall, S., Davidson, J., & Lynch, A. (Eds.). *A cultural history of the emotions* (1st ed., Vol. 1-6). Bloomsbury Academic. (2019).
14. Pritzker, S.E., Fenigsen, J., & Wilce, J.M. (Eds.). *The Routledge handbook of language and emotion*. Routledge. (2019).
15. Stets, J.E., & Turner, J.H. (Eds.). *Handbook of the sociology of emotions* (Vol. 2). Springer. (2014).

262 **Author contributions**

263 The manuscript was written primarily by the first author D.D. and last author D.S. after  
264 taking into account the inputs and rounds of comments from the other co-authors (K.A., R.A.,  
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267 E.H., A.K., D.K., B.K., D.Konstan., M.E.K., J.E.LeD., J.S.L., R.W.L., G.L., A.S.R.M.,  
268 T.A.M., A.M., P.N., B.P., I.P., C.P., S.D.P., G.P., B.R.-R., J.A.R., D.Sauter., A.S., K.R.R.,  
269 P.S., J.E.S., C.T., F.T., J.T., J.Turner, C.V.R., P.V., and T.W). I.P. and M.E.A. prepared  
270 Figures 1b-1g. Except for the first author D.D. and the last author D.S., the authorship list is  
271 in alphabetical order.

272 **Competing interests**

273 The authors declare no competing interests.

274

275 **Box**  
276

277 **The growing influence of the affective sciences in socially relevant domains**

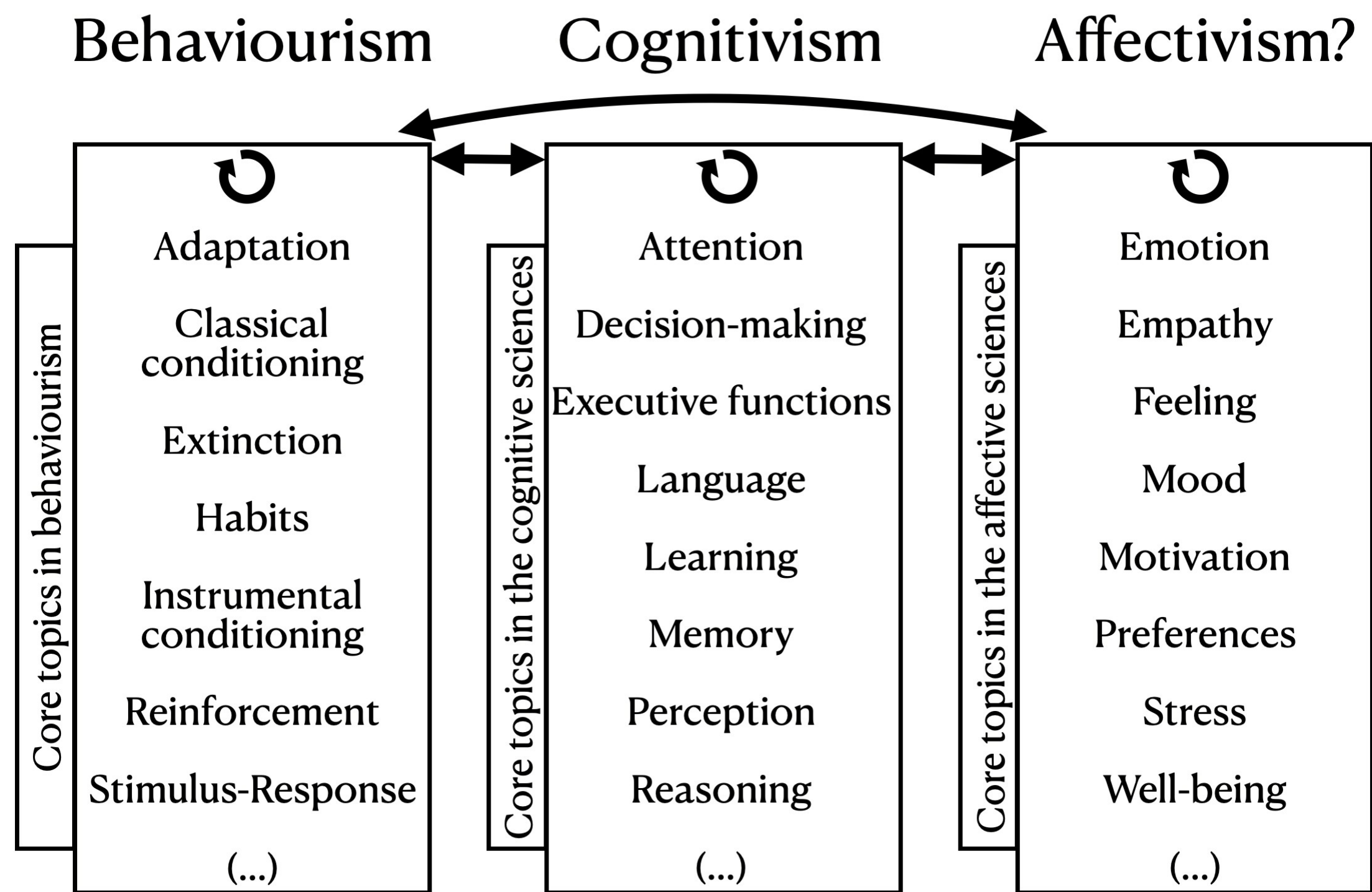
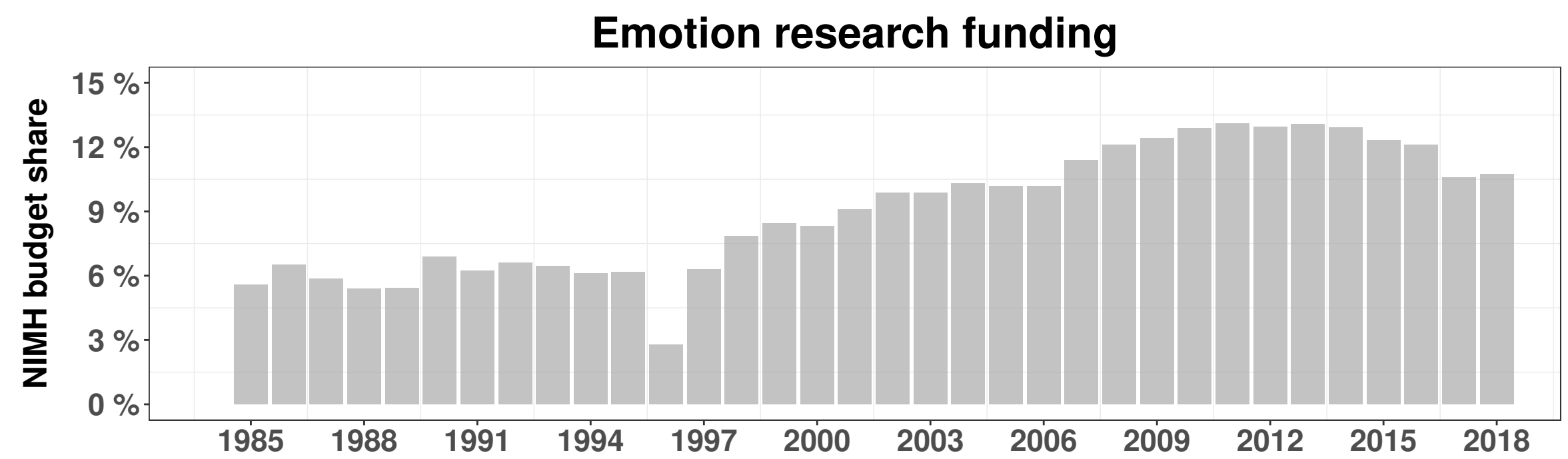
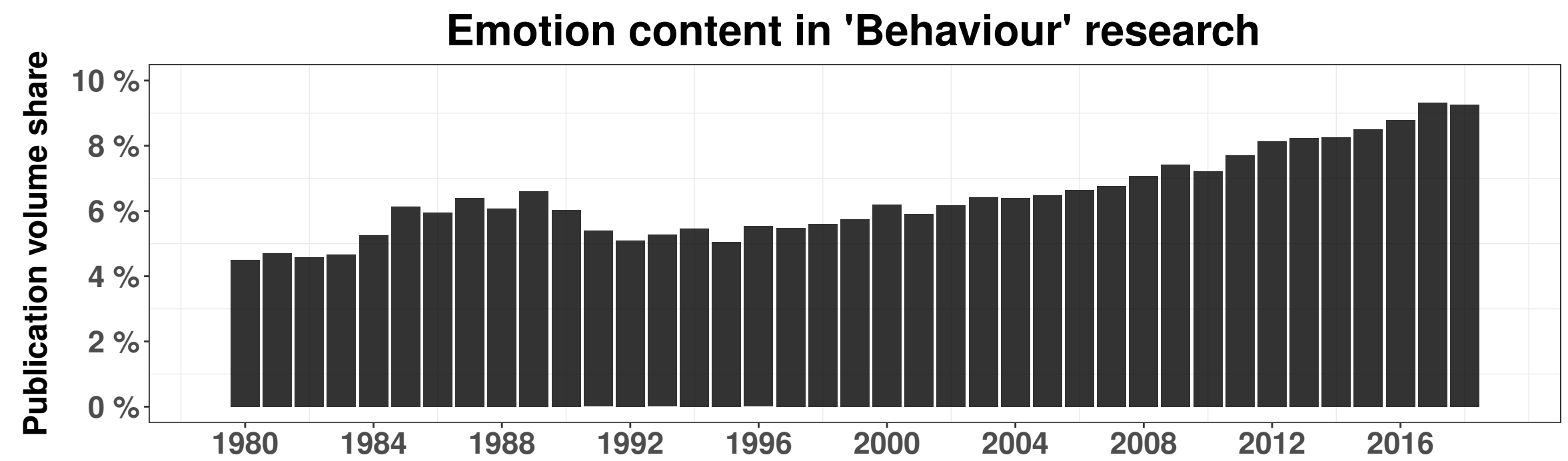
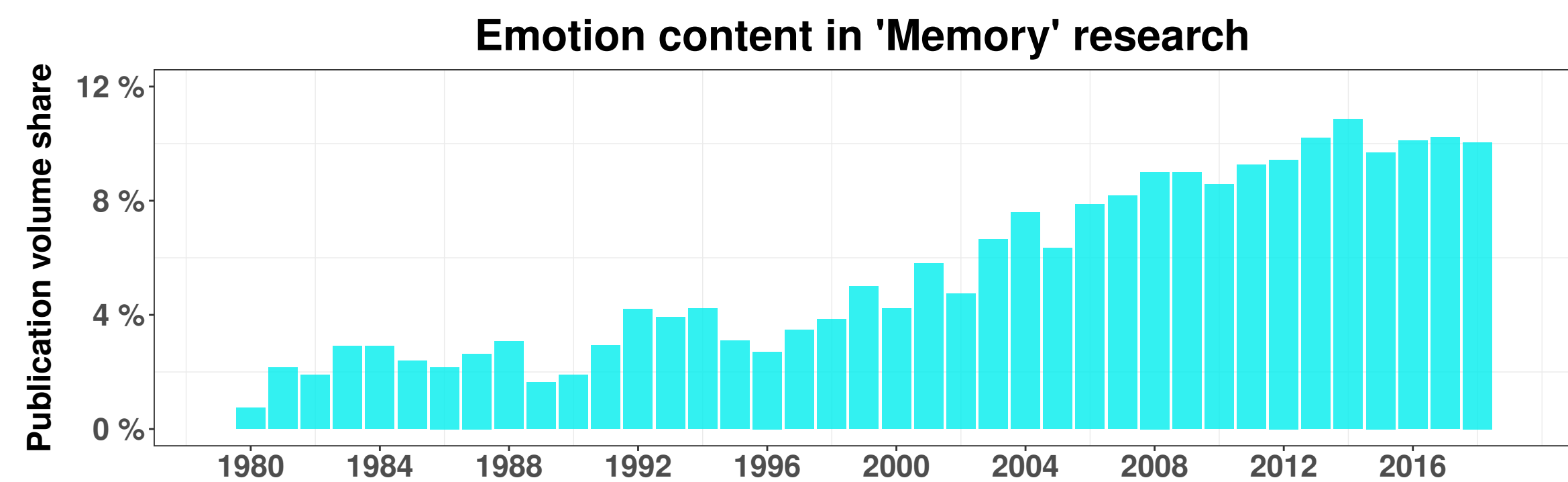
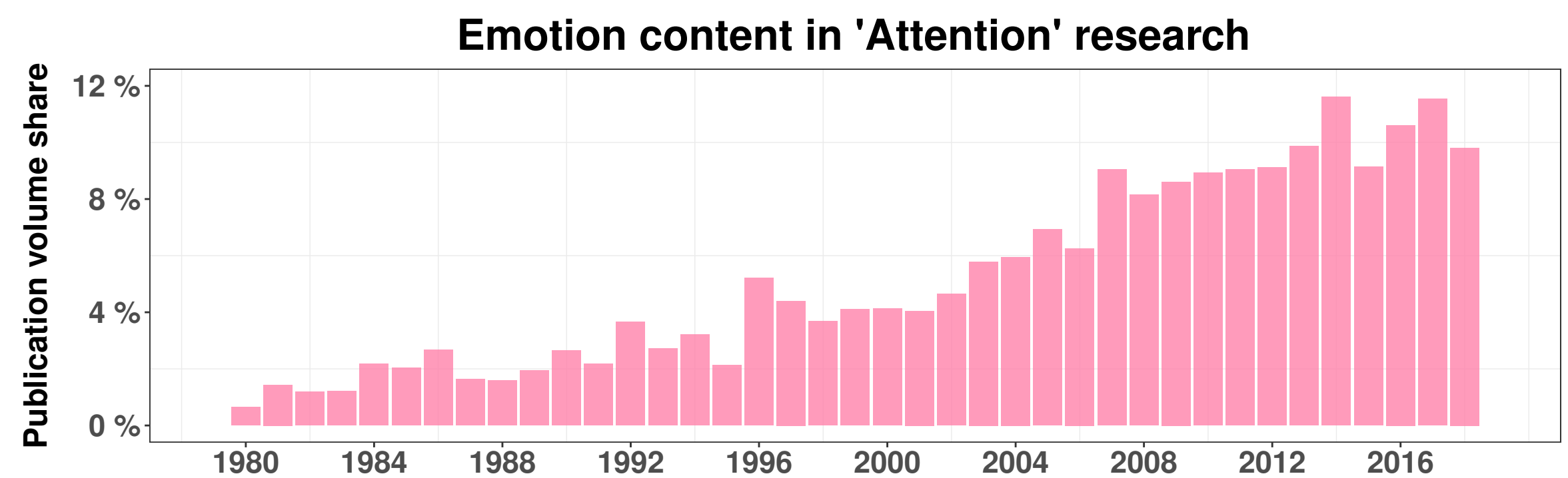
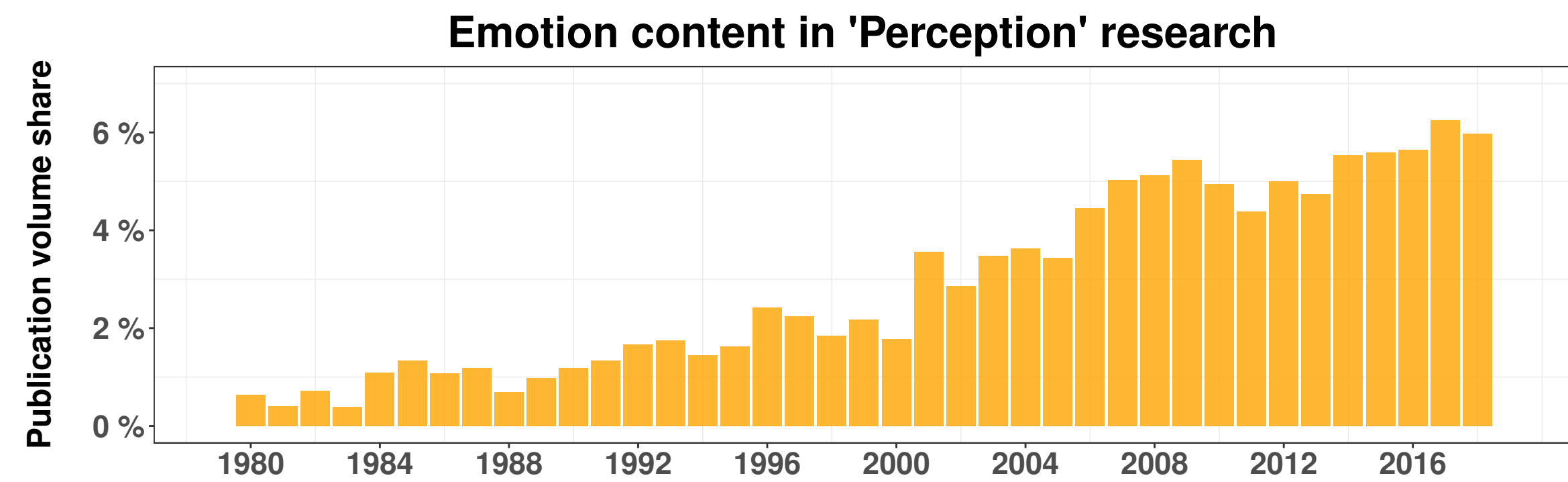
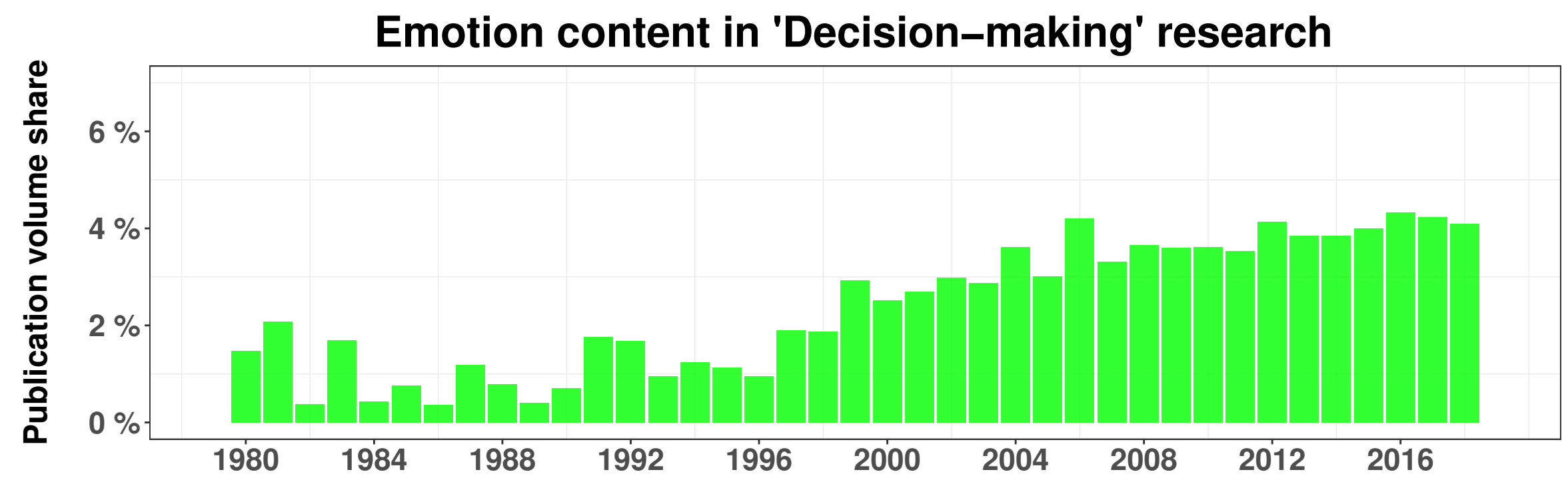
278 These examples are taken from core disciplines in the social sciences (including law,  
279 education, environmental research, conflict and reconciliation research).

- 280 • Legal scholars are increasingly challenging the incomplete behavioural and  
281 cognitive assumptions inherent in legal theory and practice, carefully  
282 considering the role of affective processes in legal decision making, and  
283 acknowledging how laws and legal rules reflect and create cultural scripts of  
284 how people *ought to feel*.
- 285 • In education research, links between well-being and education are increasingly  
286 uncovered, resulting in changes in policy and the continuing rise in the number  
287 of socio-emotional learning programs.
- 288 • In research on climate change mitigation, investigators have begun to focus on  
289 the importance of affective processes for signalling the urgency of the situation  
290 and for motivating collective remedial action, both for private citizens and  
291 governmental organizations.
- 292 • In research on violent international conflict, purely ideological or rational  
293 utility-based considerations for group and political actions are now outdated –  
294 they are no longer considered within the limited scope of what is good  
295 (conciliatory) versus what is bad (aggressive) – as research now takes into  
296 account a more diverse scope of distinct emotions and possible consequent  
297 behaviours.

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299 **Figure Caption**  
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**a****b****c****d****e****f****g**

301 **Figure 1: The scope and increasing impact of the affective sciences**

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**a**, asks whether the increasing research focus on affective processes and on their explanatory power means we are now in the era of *affectivism*. The circular arrows represent how the study of the processes within each box improves our understanding of the core mechanisms typically investigated in behaviourism, and in the cognitive and affective sciences, respectively. The bidirectional arrows between the boxes represent the idea that the mechanisms described in one box are important to understand those described in the other boxes. **b**, shows the relative increase of NIMH funding spent on research on emotion since 1985. **c**, shows the extent to which publications with considerable emotion content grew faster than those concerning behaviour without emotion content since 1980. The lower panel shows the increasing prominence of publications involving emotion as a percentage of publications in the respective area of inquiry on core cognitive mechanisms such as **d**, memory, **e**, attention, **f**, perception, and **g**, decision-making.

The reference list in the main text focuses on Handbook-type publications to represent the depth and breadth of the affective sciences across many academic fields. For a list containing some books and papers that have either helped shape the field in many disciplines in the affective sciences or that have the potential to do so, please see the suggested reading list in the supplementary material section.

### **Supplementary Material Section**

- Dataset address
- R code directory
- Figure explanations
- Supplementary Reading List

A dataset was constructed for the figures and can be found at: <https://osf.io/2ktnv/>  
The relevant R code can be found at: <https://github.com/UH-CPL/Affectivism-Code>

## Figure 1b

### The relative increase of NIMH funding spent on research on emotion since 1985

Figure 1b shows the evolution of NIMH funding on emotion as percentage of the overall NIMH budget on a yearly basis.

#### Methodology

The National Institute of Mental Health (NIMH) in the United States is the lead federal funding agency for psychology and psychiatry. It is one of the 27 agencies that make up the National Institutes of Health (NIH). Accordingly, NIMH, due to its size, prestige, and relevancy to affective and related research, provides an excellent basis for investigating research funding trends. Moreover, NIH is one of the very few research funding agencies world-wide that keeps detailed public records of its grants since 1985. This information is available through an online portal called NIH RePORTER.

From NIH RePORTER, we collected all the NIMH grant data from 1985 to 2018. Then we identified within the NIMH grants the subgroup of grants related to research on emotion as those that featured either in their title or abstract at least one of the following keywords: ‘emotion’, ‘emotions’, ‘emote’, ‘emotive’. The figure illustrates the evolution of research funding on emotion as a percentage of overall NIMH funding on a yearly basis. Performing regression on this normalised time series confirms that funding of research on emotion experienced a significant increase as portion of the overall NIMH budget (Pearson correlation,  $r = 0.260$ ,  $p < 0.001$ ). In fact, it doubled, starting from about 6% of the total budget in 1985 and reaching about 12% of the total budget in the late 2010s.

## Figure 1c

### The extent to which publications with considerable emotion content outgrew publications concerning behaviour without emotion content since 1980

Figure 1c shows the evolution of *EM* publications as percentage of the *BBM* category since 1980 (see below).

#### Methodology

The Medical Subject Headings (MeSH) thesaurus is a controlled and hierarchically organised vocabulary produced by the National Library of Medicine. It is used for indexing, cataloguing, and searching of biomedical and health-related information. MeSH includes the subject headings appearing in MEDLINE/PubMed, the NLM Catalog, and other NLM databases. (<https://www.nlm.nih.gov/mesh/meshhome.html>)

We used the MeSH category ‘Behavior and Behavior Mechanisms’ (BBM) to acquire through PubMed all the relevant publications since 1980. In this MeSH category, papers that typically featured considerable affective content fall largely under the branch ‘Emotions’ (EM). Behaviour papers with either non-affective or partly affective content fall largely under the other branches of the BBM category. We consider the EM group the forefront of affective scholarship.

We found in PubMed that between 1980 and 2018 104,563 EM publications appeared in the literature within a total of 1,449,758 BBM publications. To test if the growth in the number of EM publications is above and beyond the natural expansion of the science system the last 40 years, we computed the proportion of the EM publications each year with respect to the overall number of BBM publications that year. The figure shows the evolution of the EM proportion during the period of observation. The increase is not only statistically significant (Pearson correlation,  $r = 0.765$ ;  $p < 0.001$ ) but also materially impressive. The relative volume of publications with considerable affective content in behavioural research more or less doubled since 1980, increasing from ~4.5% in 1980 to ~9.2% in 2018.

## Figures 1d-g

### The increasing prominence of affect in research on cognitive mechanisms.

Figures 1d-1g present the evolution of emotion content as a percentage of the overall publications on memory, attention, perception, and decision-making.

#### Methodology

To investigate to what degree emotion methods and content pollinated other areas of scholarship in psychology, we selected four MeSH areas:

$$X = \{\text{'Memory', 'Attention', 'Perception', 'Decision-making'}\}.$$

For each area  $X_i$ , we ran two queries in the PubMed database: Q1: ' $X_i$  and Emotion' and Q2: ' $X_i$ '. The first, joint query yielded those publications in subject area  $X_i$  that featured significant emotion content. The second, simple query yielded all the publications in  $X_i$ , that is, both those with and those without emotion content. The figure shows the growth of publications with considerable emotion content in each area  $X_i$  as a percentage of the total number of  $X_i$  publications each year. Performing regression in all cases confirms the strong increase of the publications featuring significant emotion content in each area  $X_i$ , net of all other factors (Pearson correlation,  $r > 0.8$ ;  $p < 0.001$  in all cases). Depending on the case, this increase is between two-fold and ten-fold.

## Supplementary Reading List

Please note: No attempt has been made to ensure that this list is representative or balanced across disciplines, impact, time or theories. A more complete analysis and explanation of individual papers, books and events that led to the rise of the affectivism is currently underway as part of a complementary project.

Adolphs, R., Tranel, D., Damasio, H., & Damasio, A. (1994). Impaired recognition of emotion in facial expressions following bilateral damage to the human amygdala. *Nature*, 372(6507), 669-672. <https://doi.org/10.1038/372669a0>

Adolphs, R., Tranel, D., Damasio, H., & Damasio, A. R. (1995). Fear and the human amygdala. *Journal of Neuroscience*, 15(9), 5879-5891. <https://doi.org/10.1523/JNEUROSCI.15-09-05879.1995>

Aggleton, J. P. (Ed.). (2000). *The amygdala: A functional analysis*. Oxford University Press.

Armony, J., & Vuilleumier, P. (Eds.). (2013). *The Cambridge handbook of human affective neuroscience*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511843716>

Arnold, M. B. (1970). *Feelings and emotions: The Loyola symposium*. Academic Press.

Bally, C. (1913). *Le langage et la vie* [Language and life] (1st ed.). Payot.

Barclay, K. (2020). *The history of emotions: A student guide to methods and sources* (1st ed.). Red Globe Press.

Barrett, L. F. (2006). Are emotions natural kinds? *Perspectives on Psychological Science*, 1(1), 28-58. <https://doi.org/10.1111/j.1745-6916.2006.00003.x>

Barrett, L. F., Lewis, M., & Haviland, J. (Eds.). (2016). *Handbook of emotions* (4th ed.). Guilford Press.

Barrett, L. F., & Russell, J. A. (Eds.). (2014). *The psychological construction of emotion*. Guilford Press.

Battigalli, P., & Dufwenberg, M. (2007). Guilt in games. *American Economic Review*, 97(2), 170-176. <https://doi.org/10.1257/aer.97.2.170>

Beatty, A. (2013). Current emotion research in anthropology: Reporting the field. *Emotion Review*, 5(4), 414-422. <https://doi.org/10.1177/1754073913490045>

Beatty, A. (2019). *Emotional worlds: Beyond an anthropology of emotion*. Cambridge University Press.

Bechara, A., Tranel, D., Damasio, H., Adolphs, R., Rockland, C., & Damasio, A. R. (1995). Double dissociation of conditioning and declarative knowledge relative to the amygdala

- and hippocampus in humans. *Science*, 269(5227), 1115-1118.  
<https://doi.org/10.1126/science.7652558>
- Berkowitz, L. (1990). On the formation and regulation of anger and aggression: A cognitive-neoassociationistic analysis. *American Psychologist* 45(4), 494-503.  
<https://doi.org/10.1037//0003-066x.45.4.494>
- Berridge, K. C., & Robinson, T. E. (1998). What is the role of dopamine in reward: Hedonic impact, reward learning, or incentive salience? *Brain Research Reviews*, 28(3), 309-369. [https://doi.org/10.1016/S0165-0173\(98\)00019-8](https://doi.org/10.1016/S0165-0173(98)00019-8)
- Berridge, K. C., & Robinson, T. E. (2003). Parsing reward. *Trends in Neurosciences*, 26(9), 507-513. [https://doi.org/10.1016/S0166-2236\(03\)00233-9](https://doi.org/10.1016/S0166-2236(03)00233-9)
- Blakemore, D. (2011). On the descriptive ineffability of expressive meaning. *Journal of Pragmatics*, 43(14), 3537-3550. <https://doi.org/10.1016/j.pragma.2011.08.003>
- Boddice, R. (2014). The affective turn: Historicising the emotions. In C. Tileaga & J. Byford (Eds.), *Psychology and history: Interdisciplinary explorations* (pp. 147-165). Cambridge University Press.
- Bower, G. H. (1981). Mood and memory. *American Psychologist*, 36(2), 129-148.  
<https://doi.org/10.1037//0003-066x.36.2.129>
- Brader, T. (2005). Striking a responsive chord: How political ads motivate and persuade voters by appealing to emotions. *American Journal of Political Science*, 49(2), 388-405.  
<https://doi.org/10.1111/j.0092-5853.2005.00130.x>
- Broomhall, S., Davidson, J., & Lynch, A. (Eds). (2019). A cultural history of the emotions. 6 volumes (1st ed.). Bloomsbury Academic.
- Brosch, T. (2021). Affect and emotions as drivers of climate change perception and action: A review. *Current Opinion in Behavioral Sciences*, 42, 15-21.  
<https://doi.org/10.1016/j.cobeha.2021.02.001>
- Bush, G., Luu, P., & Posner, M. I. (2000). Cognitive and emotional influences in anterior cingulate cortex. *Trends in Cognitive Sciences*, 4(6), 215-222.  
[https://doi.org/10.1016/s1364-6613\(00\)01483-2](https://doi.org/10.1016/s1364-6613(00)01483-2)
- Cacioppo, J. T., & Berntson, G. G. (1994). Relationship between attitudes and evaluative space: A critical review, with emphasis on the separability of positive and negative substrates. *Psychological Bulletin*, 115(3), 401-423. <https://doi.org/10.1037/0033-2909.115.3.401>
- Cairns, D. L. (1993). *Aidos: The psychology and ethics of honour and shame in ancient greek literature* (1st ed.). Clarendon Press.

- Calder, A. J., Lawrence, A. D., & Young, A. W. (2001). Neuropsychology of fear and loathing. *Nature Reviews Neuroscience*, 2(5), 352-363. <https://doi.org/10.1038/35072584>
- Calvo, R. A., D'Mello, S., Gratch, J., & Kappas, A. (Eds.). (2015). *The Oxford handbook of affective computing*. Oxford University Press.
- Cambria, E. (2016). Affective computing and sentiment analysis. *Ieee Intelligent Systems*, 31(2), 102-107. <https://doi.org/10.1109/Mis.2016.31>
- Campos, J. J., Frankel, C. B., & Camras, L. (2004). On the nature of emotion regulation. *Child Development*, 75(2), 377-394. <https://doi.org/10.1111/j.1467-8624.2004.00681.x>
- Campos, J. J., Mumme, D. L., Kermoian, R., & Campos, R. G. (1994). A functionalist perspective on the nature of emotion. *Monographs of the Society for Research in Child Development*, 59(2-3), 284-303. <https://doi.org/10.2307/1166150>
- Camras, L. A., & Allison, K. (1985). Children's understanding of emotional facial expressions and verbal labels. *Journal of Nonverbal Behavior*, 9(2), 84-94. <https://doi.org/10.1007/Bf00987140>
- Cannon, W. B. (1927). The James-Lange theory of emotions: A critical examination and an alternative theory. *American Journal of Psychology*, 39, 106-124. <https://doi.org/10.2307/1415404>
- Cannon, W. B. (1929). *Bodily changes in pain, hunger, fear and rage: An account of recent research into the function of emotional excitement* (2nd ed.). Appleton-Century-Crofts.
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. Cambridge University Press. <https://doi.org/10.1017/CBO9781139174794>
- Chen, X. Y., Cen, G. Z., Li, D., & He, Y. F. (2005). Social functioning and adjustment in Chinese children: The imprint of historical time. *Child Development*, 76(1), 182-195. <https://doi.org/10.1111/j.1467-8624.2005.00838.x>
- Coan, J. A., & Allen, J. J. (Eds.). (2007). *Handbook of emotion elicitation and assessment*. Oxford University Press.
- Cochrane, T., Fantini, B., & Scherer, K. R. (Eds.). (2013). *The emotional power of music: Multidisciplinary perspectives on musical arousal, expression, and social control*. Oxford University Press.
- Cohn, A., Engelmann, J., Fehr, E., & Marechal, M. A. (2015). Evidence for countercyclical risk aversion: An experiment with financial professionals. *American Economic Review*, 105(2), 860-885. <https://doi.org/10.1257/aer.20131314>



- Cole, P. M. (1986). Children's spontaneous control of facial expression. *Child Development*, 57(6), 1309-1321. <https://doi.org/10.1111/j.1467-8624.1986.tb00459.x>
- Cole, P. M., Tamang, B. L., & Shrestha, S. (2006). Cultural variations in the socialization of young children's anger and shame. *Child Development*, 77(5), 1237-1251. <https://doi.org/10.1111/j.1467-8624.2006.00931.x>
- Craig, A. D. (2002). How do you feel? Interoception: The sense of the physiological condition of the body. *Nature Reviews Neuroscience*, 3(8), 655-666. <https://doi.org/10.1038/nrn894>
- Critchley, H. D., Wiens, S., Rotshtein, P., Ohman, A., & Dolan, R. J. (2004). Neural systems supporting interoceptive awareness. *Nature Neuroscience*, 7(2), 189-195. <https://doi.org/10.1038/nn1176>
- Crone, E. A., & Dahl, R. E. (2012). Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nature Reviews Neuroscience*, 13(9), 636-650. <https://doi.org/10.1038/nrn3313>
- Cryder, C. E., Lerner, J. S., Gross, J. J., & Dahl, R. E. (2008). Misery is not miserly: Sad and self-focused individuals spend more. *Psychological Science*, 19(6), 525-530. <https://doi.org/10.1111/j.1467-9280.2008.02118.x>
- Cunningham, W. A., Van Bavel, J. J., & Johnsen, I. R. (2008). Affective flexibility: Evaluative processing goals shape amygdala activity. *Psychological Science*, 19(2), 152-160. <https://doi.org/10.1111/j.1467-9280.2008.02061.x>
- D'Arms, J., & Jacobson, D. (2000). The moralistic fallacy: On the 'appropriateness' of emotions (Ethics, propriety, correctness). *Philosophy and Phenomenological Research*, 61(1), 65-90. <https://doi.org/10.2307/2653403>
- Dahl, A., Campos, J. J., Anderson, D. I., Uchiyama, I., Witherington, D. C., Ueno, M., Poutrain-Lejeune, L., & Barbu-Roth, M. (2013). The epigenesis of wariness of heights. *Psychological Science*, 24(7), 1361-1367. <https://doi.org/10.1177/0956797613476047>
- Dalgleish, T., & Power, M. J. (Eds.). (1999). *Handbook of cognition and emotion*. John Wiley & Sons Ltd.
- Damasio, A. R. (1994). *Descartes' error: Emotion, reason and the human brain*. Vintage.
- Damasio, A. (1999). *The feeling of what happens: Body and emotion in the making of consciousness* (1st ed.). Houghton Mifflin Harcourt.

- Damasio, A. (2003). *Looking for Spinoza: Joy, sorrow and the feeling brain* (1st ed.). Houghton Mifflin Harcourt.
- Damasio, A. (2019). *The strange order of things: Life, feeling, and the making of cultures*. Penguin Random House.
- Damasio, A., & Carvalho, G. B. (2013). The nature of feelings: Evolutionary and neurobiological origins. *Nature Reviews Neuroscience*, 14(2), 143-152. <https://doi.org/10.1038/nrn3403>
- Damasio, H., Grabowski, T., Frank, R., Galaburda, A. M., & Damasio, A. R. (1994). The return of Phineas Gage: Clues about the brain from the skull of a famous patient. *Science*, 264(5162), 1102-1105. <https://doi.org/10.1126/science.8178168>
- Darwin, C. (1872). *The expression of the emotions in man and animals*. John Murray. <https://doi.org/10.1037/10001-000>
- Davidson, R. J., & Irwin, W. (1999). The functional neuroanatomy of emotion and affective style. *Trends in Cognitive Sciences*, 3(1), 11-21. [https://doi.org/10.1016/s1364-6613\(98\)01265-0](https://doi.org/10.1016/s1364-6613(98)01265-0)
- Davidson, R. J., Jackson, D. C., & Kalin, N. H. (2000). Emotion, plasticity, context, and regulation: Perspectives from affective neuroscience. *Psychological Bulletin*, 126(6), 890-909. <https://doi.org/10.1037//0033-2909.126.6.890>
- Davidson, R. J., Scherer, K. R., & Goldsmith, H. H. (Eds.). (2003). *Handbook of affective sciences*. Oxford University Press.
- Davidson, R. J., & Sutton, S. K. (1995). Affective neuroscience: the emergence of a discipline. *Current Opinion in Neurobiology*, 5(2), 217-224. [https://doi.org/10.1016/0959-4388\(95\)80029-8](https://doi.org/10.1016/0959-4388(95)80029-8)
- Davis, M., & Whalen, P. J. (2001). The amygdala: vigilance and emotion. *Molecular Psychiatry*, 6(1), 13-34. <https://doi.org/10.1038/sj.mp.4000812>
- De Gelder, B. (2016). *Emotions and the body*. Oxford University Press.
- De Sousa, R. (1987). *The rationality of emotion*. MIT Press.
- Deigh, J. (1994). Cognitivism in the theory of emotions. *Ethics*, 104(4), 824-854. <https://doi.org/10.1086/293657>
- Deigh, J. (2008). *Emotions, values, and the law* (1st ed.). Oxford University Press.
- Denham, S. A. (1998). *Emotional development in young children*. Guilford Press.

- Deonna, J., & Teroni, F. (2012). *The emotions: A philosophical introduction* (1st ed.). Routledge.
- Descartes, R. (1990). *Les passions de l'âme* [The passions of the soul]. Le Livre de Poche. (Original work published in 1649)
- Dewey, J. (1895). The theory of emotion. *Psychological Review*, 2(1), 13-32.  
<https://doi.org/10.1037/h0070927>
- Dezecache, G., Mercier, H., & Scott-Phillips, T. C. (2013). An evolutionary approach to emotional communication. *Journal of Pragmatics*, 59, 221-233.  
<https://doi.org/10.1016/j.pragma.2013.06.007>
- Diener, E., Oishi, S., & Lucas, R. E. (2003). Personality, culture, and subjective well-being: emotional and cognitive evaluations of life. *Annual Review of Psychology*, 54, 403-425.  
<https://doi.org/10.1146/annurev.psych.54.101601.145056>
- Dolan, R. J. (2002). Emotion, cognition, and behavior. *Science*, 298(5596), 1191-1194.  
<https://doi.org/10.1126/science.1076358>
- Dorison, C. A., Wang, K., Rees, V. W., Kawachi, I., Ericson, K. M. M., & Lerner, J. S. (2020). Sadness, but not all negative emotions, heightens addictive substance use. *Proceedings of the National Academy of Sciences of the United States of America*, 117(2), 943-949. <https://doi.org/10.1073/pnas.1909888116>
- Drevets, W. C., Price, J. L., Simpson, J. R., Todd, R. D., Reich, T., Vannier, M., & Raichle, M. E. (1997). Subgenual prefrontal cortex abnormalities in mood disorders. *Nature*, 386(6627), 824-827. <https://doi.org/10.1038/386824a0>
- Duffy, E. (1941). An explanation of "emotional" phenomena without the use of the concept "emotion". *The Journal of General Psychology*, 25(2), 283-293.  
<https://doi.org/10.1080/00221309.1941.10544400>
- Dukes, D., & Clément, F. (Eds.). (2019). *Foundations of affective social learning: Conceptualizing the social transmission of value*. Cambridge University Press.  
<https://doi.org/10.1017/9781108661362>
- Dukes, D., Samson, A. C., & Walle, E. (Eds.). (Forthcoming). *The Oxford handbook of emotional development*. Oxford University Press.
- Eid, M., & Diener, E. (2001). Norms for experiencing emotions in different cultures: inter- and intranational differences. *Journal of Personality and Social Psychology*, 81(5), 869-885.  
<https://doi.org/10.1037//0022-3514.81.5.869>
- Eisenberg, N. (2000). Emotion, regulation, and moral development. *Annual Review of Psychology*, 51, 665-697. <https://doi.org/10.1146/annurev.psych.51.1.665>

- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, 9(4), 241-273. [https://doi.org/10.1207/s15327965pli0904\\_1](https://doi.org/10.1207/s15327965pli0904_1)
- Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, 101(1), 91-119. <https://doi.org/10.1037/0033-2909.101.1.91>
- Ekman, P. (1973). *Darwin and facial expression: A century of research in review*. Academic Press.
- Ekman, P., & Friesen, W.V. (1978). *Facial action coding system*. Consulting Psychologist Press.
- Ekman, P. (1992). An argument for basic emotions. *Cognition & Emotion*, 6(3-4), 169-200. <https://doi.org/10.1080/02699939208411068>
- Ekman, P. (2003). Emotions inside out. 130 years after Darwin's "The expression of the emotions in man and animal". In P. Ekman, J. J. Campos, R. J. Davidson, & F. B. M. DeWaal (Eds.), *Emotions inside out: 130 Years after Darwin's the Expression of the Emotions in Man and Animals* (Vol. 1000, pp. 1-6). <https://doi.org/10.1196/annals.1280.002>
- El Ayadi, M., Kamel, M. S., & Karray, F. (2011). Survey on speech emotion recognition: Features, classification schemes, and databases. *Pattern Recognition*, 44(3), 572-587. <https://doi.org/10.1016/j.patcog.2010.09.020>
- Elfenbein, H. A., & Ambady, N. (2002). On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin*, 128(2), 203-235. <https://doi.org/10.1037/0033-2909.128.2.203>
- Elfenbein, H. A., & Ambady, N. (2003). When familiarity breeds accuracy: Cultural exposure and facial emotion recognition. *Journal of Personality and Social Psychology*, 85(2), 276-290. <https://doi.org/10.1037/0022-3514.85.2.276>
- Elster, J. (1998). Emotions and economic theory. *Journal of Economic Literature*, 36(1), 47-74. <https://www.jstor.org/stable/2564951>
- Elster, J. (1998). *Alchemies of the mind: Rationality and the emotions*. Cambridge University Press.
- Fehr, B., & Russell, J. A. (1984). Concept of emotion viewed from a prototype perspective. *Journal of Experimental Psychology-General*, 113(3), 464-486. <https://doi.org/10.1037/0096-3445.113.3.464>

- Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, *415*(6868), 137-140. <https://doi.org/10.1038/415137a>
- Feinstein, J. S., Adolphs, R., Damasio, A., & Tranel, D. (2011). The human amygdala and the induction and experience of fear. *Current Biology*, *21*(1), 34-38. <https://doi.org/10.1016/j.cub.2010.11.042>
- Fischer, A. H., Rodriguez Mosquera, P. M., van Vianen, A. E., & Manstead, A. S. (2004). Gender and culture differences in emotion. *Emotion*, *4*(1), 87-94. <https://doi.org/10.1037/1528-3542.4.1.87>
- Fischer, K. W., Shaver, P. R., & Carnochan, P. (1990). How emotions develop and how they organise development. *Cognition and Emotion*, *4*(2), 81-127. <https://doi.org/10.1080/02699939008407142>
- Fontaine, J. R., Scherer, K. R., & Soriano, C. (Eds.). (2013). *Components of emotional meaning: A sourcebook*. Oxford University Press.
- Foolen, A. (2016). Expressives. In N. Riemer (Ed.), *The Routledge handbook of semantics* (pp. 473-490). Routledge.
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, *117*(1), 39-66. <https://doi.org/10.1037/0033-2909.117.1.39>
- Forgas, J. P. (2008). Affect and cognition. *Perspectives on Psychological Science*, *3*(2), 94-101. <https://doi.org/10.1111/j.1745-6916.2008.00067.x>
- Fox, A. S., Lapate, R. C., Shackman, A. J., & Davidson, R. J. (Eds.). (2018). *The nature of emotion: Fundamental questions* (2nd ed.). Oxford University Press.
- Fox, M. D., Snyder, A. Z., Vincent, J. L., Corbetta, M., Van Essen, D. C., & Raichle, M. E. (2005). The human brain is intrinsically organized into dynamic, anticorrelated functional networks. *Proceedings of the National Academy of Sciences of the United States of America*, *102*(27), 9673-9678. <https://doi.org/10.1073/pnas.0504136102>
- Frank, R. H. (1998). *Passions within reason: The strategic role of the emotions*. W. W. Norton & Co.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*(3), 218-226. <https://doi.org/10.1037//0003-066x.56.3.218>
- Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, *19*(3), 313-332. <https://doi.org/10.1080/02699930441000238>

- Frijda, N. H. (1986). *The emotions*. Cambridge University Press.
- Frijda, N. H. (2005). Emotion experience. *Cognition and Emotion*, 19(4), 473-497. <https://doi.org/10.1080/02699930441000346>
- Frijda, N. H. (2007). *The laws of emotion*. Lawrence Erlbaum Associates.
- Gardiner, H. N., Metcalf, R. C., & Beebe-Center, J. G. (1937). *Feeling and emotion: A history of theories*. American Book Company.
- Gendolla, G. H. (2000). On the impact of mood on behavior: An integrative theory and a review. *Review of General Psychology*, 4(4), 378-408. <https://doi.org/10.1037/1089-2680.4.4.378>
- Gendolla, G. H. E., & Richter, M. (2010). Effort mobilization when the self is involved: Some lessons from the cardiovascular system. *Review of General Psychology*, 14(3), 212-226. <https://doi.org/10.1037/a0019742>
- Gendron, M., & Barrett, L. F. (2009). Reconstructing the past: A century of ideas about emotion in psychology. *Emotion Review*, 1(4), 316-339. <https://doi.org/10.1177/1754073909338877>
- George, J. M. (2000). Emotions and leadership: The role of emotional intelligence. *Human Relations*, 53(8), 1027-1055. <https://doi.org/10.1177/0018726700538001>
- Gergely, G., & Watson, J. S. (1996). The social biofeedback theory of parental affect-mirroring: The development of emotional self-awareness and self-control in infancy. *International Journal of Psychoanalysis*, 77, 1181-1212. <https://www.pep-web.org/document.php?id=ijp.077.1181a>
- Goldie, P. (Ed.). (2009). *The Oxford handbook of philosophy of emotion*. Oxford University Press.
- Gneezy, U., & Imas, A. (2014). Materazzi effect and the strategic use of anger in competitive interactions. *Proceedings of the National Academy of Sciences of the United States of America*, 111(4), 1334-1337. <https://doi.org/10.1073/pnas.1313789111>
- Grandjean, D., & Scherer, K. R. (2008). Unpacking the cognitive architecture of emotion processes. *Emotion*, 8(3), 341-351. <https://doi.org/10.1037/1528-3542.8.3.341>
- Gratch, J., & Marsella, S. (Eds.). (2013). *Social emotions in nature and artifact*. Oxford University Press.
- Gray, J. A. (1987). *The psychology of fear and stress*. Cambridge University Press.



- Greenberg, L., & Goldman, R. (2018). *Clinical handbook of emotion focused therapy*. American Psychological Association.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, *293*(5537), 2105-2108. <https://doi.org/10.1126/science.1062872>
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, *2*(3), 271-299. <https://doi.org/10.1037/1089-2680.2.3.271>
- Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*(1), 1-26. <https://doi.org/10.1080/1047840x.2014.940781>
- Gross, J. J. (Ed.). (2015). *Handbook of emotion regulation* (2nd ed.). Guilford.
- Gross, J. J., & Barrett, L. F. (2013). The emerging field of emotion regulation: An integrative review. *Emotion*, *13*(6), 997-998. <https://doi.org/10.1037/a0034512>
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, *85*(2), 348-362. <https://doi.org/10.1037/0022-3514.85.2.348>
- Gross, J. J., Levenson, R. W., & Mendes, W. B. (2020). Affective science. *Affective Science*, *1*, 1-3.
- Haber, S. N., & Knutson, B. (2010). The reward circuit: Linking primate anatomy and human imaging. *Neuropsychopharmacology*, *35*(1), 4-26. <https://doi.org/10.1038/npp.2009.129>
- Haidt, J., & Bjorklund, F. (2008). Social intuitionists answer six questions about moral psychology. In W. Sinnott-Armstrong (Ed.), *Moral psychology, volume 2: The cognitive science of morality: Intuition and diversity* (Vol. 2, pp. 181-217). MIT Press.
- Haidt, J., & Hersh, M. A. (2001). Sexual morality: The cultures and emotions of conservatives and liberals. *Journal of Applied Social Psychology*, *31*(1), 191-221. <https://doi.org/10.1111/j.1559-1816.2001.tb02489.x>
- Hair, N. L., Hanson, J. L., Wolfe, B. L., & Pollak, S. D. (2015). Association of child poverty, brain development, and academic achievement. *Jama Pediatrics*, *169*(9), 822-829. <https://doi.org/10.1001/jamapediatrics.2015.1475>
- Halberstadt, A. G., Denham, S. A., & Dunsmore, J. C. (2001). Affective social competence. *Social Development*, *10*(1), 79-119. <https://doi.org/10.1111/1467-9507.00150>
- Halberstadt, A. G., & Lozada, F. T. (2011). Emotion development in infancy through the lens of culture. *Emotion Review*, *3*(2), 158-168. <https://doi.org/10.1177/1754073910387946>

- Halperin, E. (2016). *Emotions in conflict: Inhibitors and facilitators of peace making*. Routledge.
- Hamann, S. B., Stefanacci, L., Squire, L. R., Adolphs, R., Tranel, D., Damasio, H., & Damasio, A. (1996). Recognizing facial emotion. *Nature*, 379(6565), 497-497. <https://doi.org/10.1038/379497a0>
- Harmon-Jones, E. (2003). Anger and the behavioral approach system. *Personality and Individual Differences*, 35(5), 995-1005. [https://doi.org/10.1016/s0191-8869\(02\)00313-6](https://doi.org/10.1016/s0191-8869(02)00313-6)
- Harris, P. L. (1989). *Children and emotion: The development of psychological understanding*. Basil Blackwell.
- Harris, P. L. (2012). *Trusting what you're told: How children learn from others*. Harvard University Press.
- Harris, W. V. (2004). *Restraining rage: The ideology of anger control in classical antiquity*. Harvard University Press.
- Hochschild, A. R. (1979). Emotion work, feeling rules, and social-structure. *American Journal of Sociology*, 85(3), 551-575. <https://doi.org/10.1086/227049>
- Huppes-Cluysenaer, L., & Coelho, N. M. M. S. (Eds.). (2018). *Aristotle on emotions in law and politics*. Springer International.
- Izard, C. E. (1971). *The face of emotion*. Appleton-Century-Crofts.
- Izard, C. E. (2007). Basic emotions, natural kinds, emotion schemas, and a new paradigm. *Perspectives on Psychological Science*, 2(3), 260-280. <https://doi.org/10.1111/j.1745-6916.2007.00044.x>
- Jack, R. E., Garrod, O. G., Yu, H., Caldara, R., & Schyns, P. G. (2012). Facial expressions of emotion are not culturally universal. *Proceedings of the National Academy of Sciences of the United States of America*, 109(19), 7241-7244. <https://doi.org/10.1073/pnas.1200155109>
- Jackson, J. C., Watts, J., Henry, T. R., List, J. M., Forkel, R., Mucha, P. J., Greenhill, S. J., Gray, R. D., & Lindquist, K. A. (2019). Emotion semantics show both cultural variation and universal structure. *Science*, 366(6472), 1517-1522. <https://doi.org/10.1126/science.aaw8160>
- James, W. (1884). What is an emotion? *Mind*, 9(34), 188-205. <https://cutt.ly/EkPcgMp>
- James, W. (1890). *The principles of psychology*. Dover Publications.
- James, W. (1894). The physical basis of emotion. *Psychological Review*, 101(2), 205-210. <https://doi.org/10.1037/0033-295X.101.2.205>



Jasper, J. M. (1998). The emotions of protest: Affective and reactive emotions in and around social movements. *Sociological Forum*, 13(3), 397-424.  
<https://doi.org/10.1023/A:1022175308081>

Juslin, P. N., & Sloboda, J. A. (Eds.). (2010). *Handbook of music and emotion*. Oxford University Press.

Kagan, J. (1989). *Unstable ideas: Temperament, cognition, and self*. Harvard University Press.

Kagan, J. (2018). *Galen's prophecy: Temperament in human nature*. Routledge.

Kagan, J., Reznick, J. S., & Snidman, N. (1988). Biological bases of childhood shyness. *Science*, 240(4849), 167-171. <https://doi.org/10.1126/science.3353713>

Kaster, R. A. (2007). *Emotion, restraint, and community in ancient Rome* (1st ed.). Oxford University Press.

Keltner, D., & Lerner, J. S. (2010). Emotion. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (5th ed., Vol. 1, pp. 317-352). Wiley.  
<https://doi.org/10.1002/9780470561119.socpsy001009>

Kitayama, S., Mesquita, B., & Karasawa, M. (2006). Cultural affordances and emotional experience: socially engaging and disengaging emotions in Japan and the United States. *Journal of Personality and Social Psychology*, 91(5), 890-903.  
<https://doi.org/10.1037/0022-3514.91.5.890>

Klüver, H., & Bucy, P. C. (1937). "Psychic blindness" and other symptoms following bilateral temporal lobectomy in Rhesus monkeys. *American Journal of Physiology*, 119, 352-353. <https://psycnet.apa.org/record/1938-00651-001>

Knutson, B., & Greer, S. M. (2008). Anticipatory affect: Neural correlates and consequences for choice. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 363(1511), 3771-3786. <https://doi.org/10.1098/rstb.2008.0155>

Knutson, B., Taylor, J., Kaufman, M., Peterson, R., & Glover, G. (2005). Distributed neural representation of expected value. *Journal of Neuroscience*, 25(19), 4806-4812.  
<https://doi.org/10.1523/jneurosci.0642-05.2005>

Konstan, D. (2006). *The emotions of the ancient Greeks: Studies in Aristotle and classical literature*. University of Toronto Press.

Kosslyn, S. M., & Koenig, O. (1992). *Wet mind, the new cognitive neuroscience*. Free Press.

- Kövecses, Z. (2005). *Metaphor in culture: Universality and variation*. Cambridge University Press.
- Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. *Biological Psychology*, 84(3), 394-421. <https://doi.org/10.1016/j.biopsycho.2010.03.010>
- Kret, M. E., Massen, J., & Bliss-Moreau, E. (2021). Special issue: Building a truly comparative affective science. *Neuroscience and Biobehavioral Reviews*.  
<https://www.sciencedirect.com/journal/neuroscience-and-biobehavioral-reviews/special-issue/10Q4N0GFXM7>
- Kringelbach, M. L., & Berridge, K. C. (2009). Towards a functional neuroanatomy of pleasure and happiness. *Trends in Cognitive Sciences*, 13(11), 479-487.  
<https://doi.org/10.1016/j.tics.2009.08.006>
- LaBar, K. S., & Cabeza, R. (2006). Cognitive neuroscience of emotional memory. *Nature Reviews Neuroscience*, 7(1), 54-64. <https://doi.org/10.1038/nrn1825>
- LaBar, K. S., Gatenby, J. C., Gore, J. C., LeDoux, J. E., & Phelps, E. A. (1998). Human amygdala activation during conditioned fear acquisition and extinction: A mixed-trial fMRI study. *Neuron*, 20(5), 937-945. [https://doi.org/10.1016/s0896-6273\(00\)80475-4](https://doi.org/10.1016/s0896-6273(00)80475-4)
- Lang, P. J. (1994). The varieties of emotional experience: a meditation on James-Lange theory. *Psychological Review*, 101(2), 211-221. <https://doi.org/10.1037/0033-295x.101.2.211>
- Lange, C. G. (1912). The mechanism of the emotions (B. Rand, Ed. & Trans). In *The classical psychologists*. (pp. 672-684). Houghton Mifflin. <https://www.sapili.org/subir-depois/en/ps000132.pdf> (Original work published in 1885)
- Lazarus, R. S. (1982). Thoughts on the relations between emotion and cognition. *American Psychologist*, 37(9), 1019-1024. <https://doi.org/10.1037/0003-066x.37.9.1019>
- Lazarus, R. S. (1984). On the primacy of cognition. *American Psychologist*, 39(2), 124-129. <https://doi.org/10.1037/0003-066x.39.2.124>
- Lazarus, R. S. (1991). *Emotion and adaptation* (1st ed.). Oxford University Press.
- LeDoux, J. E. (1996). *The emotional brain: The mysterious underpinnings of emotional life*. Simon & Schuster.
- LeDoux, J. E. (2000). Emotion circuits in the brain. *Annual Review of Neuroscience*, 23, 155-184. <https://doi.org/10.1146/annurev.neuro.23.1.155>
- LeDoux, J. E. (2012). Rethinking the emotional brain. *Neuron*, 73(4), 653-676. <https://doi.org/10.1016/j.neuron.2012.02.004>

- LeDoux, J. E. (2017). Semantics, surplus meaning, and the science of fear. *Trends in Cognitive Sciences*, 21(5), 303-306. <https://doi.org/10.1016/j.tics.2017.02.004>
- LeDoux, J. E. (2019). *The deep history of ourselves: The four-billion-year story of how we got conscious brains*. Viking.
- LeDoux, J. E. (2020). Thoughtful feelings. *Current Biology*, 30(11), R619-R623. <https://doi.org/10.1016/j.cub.2020.04.012>
- Lerner, J. S., Gonzalez, R. M., Small, D. A., & Fischhoff, B. (2003). Effects of fear and anger on perceived risks of terrorism: A national field experiment. *Psychological Science*, 14(2), 144-150. <https://doi.org/10.1111/1467-9280.01433>
- Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgement and choice. *Cognition & Emotion*, 14(4), 473-493. <https://doi.org/10.1080/026999300402763>
- Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, 81(1), 146-159. <https://doi.org/10.1037//0022-3514.81.1.146>
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and decision making. *Annual Review of Psychology*, 66, 799-823. <https://doi.org/10.1146/annurev-psych-010213-115043>
- Lerner, J. S., Small, D. A., & Loewenstein, G. (2004). Heart strings and purse strings: Carryover effects of emotions on economic decisions. *Psychological Science*, 15(5), 337-341. <https://doi.org/10.1111/j.0956-7976.2004.00679.x>
- Levenson, R. W. (1999). The intrapersonal functions of emotion. *Cognition and Emotion*, 13(5), 481-504. <https://doi.org/10.1080/026999399379159>
- Levenson, R. W. (2011). Basic emotion questions. *Emotion Review*, 3(4), 379-386. <https://doi.org/10.1177/1754073911410743>
- Leventhal, H., & Scherer, K. R. (1987). The relationship of emotion to cognition: A functional approach to a semantic controversy. *Cognition and Emotion*, 1(1), 3-28. <https://doi.org/10.1080/02699938708408361>
- Lieberman, M. D., & Eisenberger, N. I. (2009). Pains and pleasures of social life. *Science*, 323(5916), 890-891. <https://doi.org/10.1126/science.1170008>
- Loewenstein, G. (1987). Anticipation and the Valuation of Delayed Consumption. *Economic Journal*, 97(387), 666-684. <https://doi.org/10.2307/2232929>

- Loewenstein, G. (1996). Out of control: Visceral influences on behavior. *Organizational Behavior and Human Decision Processes*, 65(3), 272-292. <https://doi.org/10.1006/obhd.1996.0028>
- Loewenstein, G. (2000). Emotions in economic theory and economic behavior. *American Economic Review*, 90(2), 426-432. <https://doi.org/10.1257/aer.90.2.426>
- Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Projection bias in predicting future utility. *Quarterly Journal of Economics*, 118(4), 1209-1248. <https://doi.org/10.1162/003355303322552784>
- Lugrin, B., Pelachaud, C., & Traum, D. (Eds.). (forthcoming). *Socially Interactive Agents* (Vol. 1 & 2). Association for Computing Machinery.
- Lutz, C., & White, G. M. (1986). The anthropology of emotions. *Annual Review of Anthropology*, 15, 405-436. <https://doi.org/10.1146/annurev.an.15.100186.002201>
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: does happiness lead to success? *Psychological Bulletin*, 131(6), 803-855. <https://doi.org/10.1037/0033-2909.131.6.803>
- Maclean, P. D. (1949). Psychosomatic disease and the "visceral brain"; recent developments bearing on the Papez theory of emotion. *Psychosomatic Medicine*, 11, 338-353. <https://doi.org/10.1097/00006842-194911000-00003>
- Maclean, P. D. (1952). Some Psychiatric Implications of Physiological Studies on Frontotemporal Portion of Limbic System (Visceral Brain). *Electroencephalography and Clinical Neurophysiology*, 4(4), 407-418. [https://doi.org/10.1016/0013-4694\(52\)90073-4](https://doi.org/10.1016/0013-4694(52)90073-4)
- Mandler, G. (1975). *Mind and emotion*. Wiley.
- Manstead, A. S. R., Frijda, N. H., & Fischer, A. H. (Eds.). (2004). *Feelings and emotions: The Amsterdam symposium*. Cambridge University Press.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), 224-253. <https://doi.org/10.1037/0033-295x.98.2.224>
- Maroney, T. A., & Gross, J. J. (2014). The ideal of the dispassionate judge: An emotion regulation perspective. *Emotion Review*, 6(2), 142-151. <https://doi.org/10.1177/1754073913491989>
- Matsumoto, D. (1989). Cultural influences on the perception of emotion. *Journal of Cross-Cultural Psychology*, 20(1), 92-105. <https://doi.org/10.1177/0022022189201006>

- Matsumoto, D., Yoo, S. H., Nakagawa, S., & members of the Multinational Study of Cultural Display, R. (2008). Culture, emotion regulation, and adjustment. *Journal of Personality and Social Psychology*, 94(6), 925-937. <https://doi.org/10.1037/0022-3514.94.6.925>
- McGaugh, J. L. (2006). Make mild moments memorable: Add a little arousal. *Trends in Cognitive Sciences*, 10(8), 345-347. <https://doi.org/10.1016/j.tics.2006.06.001>
- Mesquita, B., & Frijda, N. H. (1992). Cultural variations in emotions: a review. *Psychological Bulletin*, 112(2), 179-204. <https://doi.org/10.1037/0033-2909.112.2.179>
- Mineka, S., & Ohman, A. (2002). Phobias and preparedness: The selective, automatic, and encapsulated nature of fear. *Biological Psychiatry*, 52(10), 927-937. [https://doi.org/10.1016/s0006-3223\(02\)01669-4](https://doi.org/10.1016/s0006-3223(02)01669-4)
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102(2), 246-268. <https://doi.org/10.1037/0033-295x.102.2.246>
- Moors, A. (2009). Theories of emotion causation: A review. *Cognition and Emotion*, 23(4), 625-662. <https://doi.org/10.1080/02699930802645739>
- Moors, A. (2017). Integration of two skeptical emotion theories: Dimensional appraisal theory and Russell's psychological construction theory. *Psychological Inquiry*, 28(1), 1-19. <https://doi.org/10.1080/1047840x.2017.1235900>
- Moors, A., Ellsworth, P. C., Scherer, K. R., & Frijda, N. H. (2013). Appraisal theories of emotion: State of the art and future development. *Emotion Review*, 5(2), 119-124. <https://doi.org/10.1177/1754073912468165>
- Morris, J. S., Frith, C. D., Perrett, D. I., Rowland, D., Young, A. W., Calder, A. J., & Dolan, R. J. (1996). A differential neural response in the human amygdala to fearful and happy facial expressions. *Nature*, 383(6603), 812-815. <https://doi.org/10.1038/383812a0>
- Murphy, S. T., & Zajonc, R. B. (1993). Affect, cognition, and awareness: affective priming with optimal and suboptimal stimulus exposures. *Journal of Personality and Social Psychology*, 64(5), 723-739. <https://doi.org/10.1037//0022-3514.64.5.723>
- Nader, K., Schafe, G. E., & Le Doux, J. E. (2000). Fear memories require protein synthesis in the amygdala for reconsolidation after retrieval. *Nature*, 406(6797), 722-726. <https://doi.org/10.1038/35021052>
- Niedenthal, P. M. (2007). Embodying emotion. *Science*, 316(5827), 1002-1005. <https://doi.org/10.1126/science.1136930>

- Nummenmaa, L., Glerean, E., Hari, R., & Hietanen, J. K. (2014). Bodily maps of emotions. *Proceedings of the National Academy of Sciences of the United States of America*, 111(2), 646-651. <https://doi.org/10.1073/pnas.1321664111>
- Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. *Trends in Cognitive Sciences*, 9(5), 242-249. <https://doi.org/10.1016/j.tics.2005.03.010>
- Öhman, A. (1986). Face the beast and fear the face: Animal and social fears as prototypes for evolutionary analyses of emotion. *Psychophysiology*, 23(2), 123-145. <https://doi.org/10.1111/j.1469-8986.1986.tb00608.x>
- Öhman, A., Flykt, A., & Esteves, F. (2001). Emotion drives attention: detecting the snake in the grass. *Journal of Experimental Psychology: General*, 130(3), 466-478. <https://doi.org/10.1037//0096-3445.130.3.466>
- Öhman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review*, 108(3), 483-522. <https://doi.org/10.1037//0033-295x.108.3.483>
- Olsson, A., & Phelps, E. A. (2007). Social learning of fear. *Nature Neuroscience*, 10(9), 1095-1102. <https://doi.org/10.1038/nn1968>
- Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. Cambridge University Press.
- Ortony, A., & Turner, T. J. (1990). What's basic about basic emotions? *Psychological Review*, 97(3), 315-331. <https://doi.org/10.1037/0033-295x.97.3.315>
- Oviatt, S., Schuller, B., Cohen, P., Sonntag, D., Potamianos, G., & Krüger, A. (2019). *The handbook of multimodal-multisensor interfaces: Language processing, software, commercialization, and emerging direction* (Vol. 3). Association for Computing Machinery.
- Oviatt, S., Schuller, B., Phil, C., Sonntag, D., Potamianos, G., & Kruger, A. (2018). *The handbook of multimodal-multisensor interfaces: Signal processing, architectures, and detection of emotion and cognition* (Vol. 2). Association for Computing Machinery. <https://doi.org/10.1145/3107990>
- Panksepp, J. (1991). Affective neuroscience: A conceptual framework for the neurobiological study of emotions. In K. Strongman (Ed.), *International reviews of emotion research* (pp. 59-99). Wiley.
- Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions* (1st ed.). Oxford University Press.



- Papez, J. W. (1937). A proposed mechanism of emotion. *Archives of Neurology and Psychiatry*, 38(4), 725-743.  
<https://doi.org/10.1001/archneurpsyc.1937.02260220069003>
- Parkinson, B., Fischer, A. H., & Manstead, A. S. R. (2005). *Emotion in social relations: Cultural, group, and interpersonal processes*. Psychology Press.
- Parkinson, B., & Manstead, A. S. R. (2015). Current emotion research in social psychology: Thinking about emotions and other people. *Emotion Review*, 7(4), 371-380.  
<https://doi.org/10.1177/1754073915590624>
- Parrott, W. G., & Schulkin, J. (1993). Neuropsychology and the cognitive nature of the emotions. *Cognition and Emotion*, 7(1), 43-59.  
<https://doi.org/10.1080/02699939308409175>
- Pavlidis, I., Ahmed, M. E., Dukes, D., & Sander, D. (2020). *Affectivism Manifesto Dataset* [Data set]. OSFHOME. <https://doi.org/10.17605/OSF.IO/2KTNV>
- Pekrun, R., Frenzel, A., Goetz, T., & Perry, R. P. (2007). The control–value theory of achievement emotions: An integrative approach to emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 13-36). Academic Press.
- Peper, M., & Markowitsch, H. J. (2001). Pioneers of affective neuroscience and early concepts of the emotional brain. *Journal of the History of the Neurosciences*, 10(1), 58-66.  
<https://doi.org/10.1076/jhin.10.1.58.5628>
- Pessoa, L., & Adolphs, R. (2010). Emotion processing and the amygdala: from a 'low road' to 'many roads' of evaluating biological significance. *Nature Reviews Neuroscience*, 11(11), 773-782. <https://doi.org/10.1038/nrn2920>
- Phelps, E. A., & LeDoux, J. E. (2005). Contributions of the amygdala to emotion processing: From animal models to human behavior. *Neuron*, 48(2), 175-187.  
<https://doi.org/10.1016/j.neuron.2005.09.025>
- Picard, R. W. (2000). *Affective computing*. MIT press.
- Picard, R. W., Vyzas, E., & Healey, J. (2001). Toward machine emotional intelligence: Analysis of affective physiological state. *Ieee Transactions on Pattern Analysis and Machine Intelligence*, 23(10), 1175-1191. <https://doi.org/10.1109/34.954607>
- Plutchik, R. (1980). A general psychoevolutionary theory of emotion. In R. Plutchik & H. Kellerman (Eds.), *Emotion: Theory, research and experience, Theories of emotion* (Vol. 1, pp. 3–33). Academic Press. <https://doi.org/10.1016/B978-0-12-558701-3.50007-7>

- Pollak, S. D., Camras, L. A., & Cole, P. M. (2019). Progress in understanding the emergence of human emotion. *Developmental Psychology*, 55(9), 1801-1811. <https://doi.org/10.1037/dev0000789>
- Pollak, S. D., Camras, L. A., & Cole, P. M. (2019). Special Issue: New Perspectives on the Development of Human Emotion. *Developmental Psychology*.
- Pollak, S. D., Cicchetti, D., Hornung, K., & Reed, A. (2000). Recognizing emotion in faces: Developmental effects of child abuse and neglect. *Developmental Psychology*, 36(5), 679-688. <https://doi.org/10.1037//0012-1649.36.5.679>
- Posner, J., Russell, J. A., & Peterson, B. S. (2005). The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. *Development and Psychopathology*, 17(3), 715-734. <https://doi.org/10.1017/s0954579405050340>
- Potts, C. (2007). The expressive dimension. *Theoretical Linguistics*, 33(2), 165-198. <https://doi.org/10.1515/tl.2007.011>
- Preston, S. D., & de Waal, F. B. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences*, 25(1), 1-20; discussion 20-71. <https://doi.org/10.1017/s0140525x02000018>
- Prinz, J. J. (2004). *Gut reactions: A perceptual theory of the emotions*. Oxford University Press.
- Pritzker, S. E., Fenigsen, J., & M., W. J. (Eds.). (2019). *The Routledge handbook of language and emotion*. Routledge.
- Reddy, V. (2008). *How infants know minds*. Harvard University Press.
- Reisenzein, R. (1983). The Schachter theory of emotion: two decades later. *Psychological Bulletin*, 94(2), 239-264. <https://doi.org/10.1037/0033-2909.94.2.239>
- Reschke, P. J., Walle, E. A., & Dukes, D. (2017). Interpersonal development in infancy: The interconnectedness of emotion understanding and social cognition. *Child Development Perspectives*, 11(3), 178-183. <https://doi.org/10.1111/cdep.12230>
- Reymert, M. L. (Ed.). (1928). Feelings and emotions: The Wittenberg symposium by thirty-four psychologists. *British Journal of Medical Psychology*, 10(3), 289-293. <https://doi.org/10.1111/j.2044-8341.1930.tb01028.x>
- Reymert, M. L. (Ed.). (1950). *Feelings and emotions: The Mooseheart symposium in cooperation with the University of Chicago*. McGraw-Hill.



Roberts, R. C. (2003). *Emotions: An essay in aid of moral psychology*. Cambridge University Press.

Rolls, E. T. (1996). *The brain and emotion*. Oxford University Press.

Rosenwein, B. H., & Cristiani, R. (2018). *What is the history of emotions? (What is history?)* (1st ed.). Polity Press.

Ruba, A. L., & Pollak, S. D. (2020). The development of emotion reasoning in infancy and early childhood. *Annual Review of Developmental Psychology*, 2, 503-531.  
<https://doi.org/10.1146/annurev-devpsych-060320-102556>

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39(6), 1161-1178. <https://doi.org/10.1037/h0077714>

Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, 110(1), 145-172. <https://doi.org/10.1037/0033-295x.110.1.145>

Saarimäki, H., Gotsopoulos, A., Jaaskelainen, I. P., Lampinen, J., Vuilleumier, P., Hari, R., Sams, M., & Nummenmaa, L. (2016). Discrete neural signatures of basic emotions. *Cerebral Cortex*, 26(6), 2563-2573. <https://doi.org/10.1093/cercor/bhv086>

Sander, D., & Scherer, K. R. (Eds.). (2009). *The Oxford companion to emotion and the affective sciences*. Oxford University Press.

Sander, D., Grafman, J., & Zalla, T. (2003). The human amygdala: An evolved system for relevance detection. *Reviews in the Neurosciences*, 14(4), 303-316.  
<https://doi.org/10.1515/revneuro.2003.14.4.303>

Sander, D., Grandjean, D., & Scherer, K. R. (2005). A systems approach to appraisal mechanisms in emotion. *Neural Networks*, 18(4), 317-352.  
<https://doi.org/10.1016/j.neunet.2005.03.001>

Scarantino, A. (Ed.). (forthcoming). *The Routledge handbook of emotion theory*. Routledge.

Scarantino, A., & De Sousa, R. (2018). Emotion. In E. N. E. N. Zalta (Ed.), *Stanford encyclopedia of philosophy*. Stanford University.  
<https://plato.stanford.edu/archives/win2018/entries/emotion/>

Schachter, S., & Singer, J. E. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review*, 69(5), 379-399.  
<https://doi.org/10.1037/h0046234>

Scheff, T. J. (1988). Shame and conformity: The deference-emotion system. *American Sociological Review*, 53(3), 395-406. <https://doi.org/10.2307/2095647>

- Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social Science Information sur les Sciences Sociales*, 44(4), 695-729. <https://doi.org/10.1177/0539018405058216>
- Scherer, K. R. (2009). Emotions are emergent processes: they require a dynamic computational architecture. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 364(1535), 3459-3474. <https://doi.org/10.1098/rstb.2009.0141>
- Scherer, K. R. (2016). What are emotions? And how can they be measured? *Social Science Information*, 44(4), 695-729. <https://doi.org/10.1177/0539018405058216>
- Scherer, K. R., Banse, R., & Wallbott, H. G. (2001). Emotion inferences from vocal expression correlate across languages and cultures. *Journal of Cross-Cultural Psychology*, 32(1), 76-92. <https://doi.org/10.1177/0022022101032001009>
- Scherer, K. R., Bänziger, T., & Roesch, E. (Eds.). (2010). *A blueprint for affective computing: A sourcebook and manual*. Oxford University Press.
- Scherer, K. R., & Mehu, M. (2015). Normal and abnormal emotions—The quandary of diagnosing affective disorder: Introduction and overview. *Emotion Review*, 7(3), 201-203. <https://doi.org/10.1177/1754073915576689>
- Schiewer, G. L., Altarriba, J., & Ng, B. C. (Eds.). (forthcoming, due 2022). *Language and emotion: An international handbook* (Vol. 1). De Gruyter Mouton.
- Schneirla, T. C. (1959). An evolutionary and developmental theory of biphasic processes underlying approach and withdrawal. In M. R. Jones (Ed.), *Current theory and research in motivation* (pp. 1-49). University of Nebraska Press.
- Schore, A. N. (2015). *Affect regulation and the origin of the self: The neurobiology of emotional development*. Routledge.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, 45(3), 513-523. <https://doi.org/10.1037/0022-3514.45.3.513>
- Sergerie, K., Chochol, C., & Armony, J. L. (2008). The role of the amygdala in emotional processing: A quantitative meta-analysis of functional neuroimaging studies. *Neuroscience and Biobehavioral Reviews*, 32(4), 811-830. <https://doi.org/10.1016/j.neubiorev.2007.12.002>
- Shott, S. (1979). Emotion and social-life: A symbolic interactionist analysis. *American Journal of Sociology*, 84(6), 1317-1334. <https://doi.org/10.1086/226936>
- Silvia, P. J. (2006). *Exploring the psychology of interest*. Oxford University Press.

- Simon, H. A. (1967). Motivational and emotional controls of cognition. *Psychological Review*, 74(1), 29-39. <https://doi.org/10.1037/h0024127>
- Singer, T., Seymour, B., O'Doherty, J., Kaube, H., Dolan, R. J., & Frith, C. D. (2004). Empathy for pain involves the affective but not sensory components of pain. *Science*, 303(5661), 1157-1162. <https://doi.org/10.1126/science.1093535>
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, 48(4), 813-838. <https://doi.org/10.1037/0022-3514.48.4.813>
- Sorce, J. F., Emde, R. N., Campos, J., & Klinnert, M. D. (1985). Maternal emotional signaling - Its effect on the visual-cliff behavior of 1-year-olds. *Developmental Psychology*, 21(1), 195-200. <https://doi.org/10.1037/0012-1649.21.1.195>
- Sperber, D., & Wilson, D. (2015). Beyond speaker's meaning. *Croatian Journal of Philosophy*, 15(44), 117-149. <https://hrcak.srce.hr/file/246524>
- Sroufe, L. A. (1996). *Emotional development: The organization of emotional life in the early years*. Cambridge University Press.
- Stearns, P. N., & Stearns, C. Z. (1985). Emotionology: Clarifying the history of emotions and emotional standards. *American Historical Review*, 90(4), 813-836. <https://doi.org/10.2307/1858841>
- Stern, D. N. (1985). *The interpersonal world of the infant*. Basic Books.
- Stets, J. E., & Turner, J. H. (2008). The sociology of emotions. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions* (3rd ed., pp. 32-46). Guilford.
- Stets, J. E., & Turner, J. H. (Eds.). (2014). *Handbook of the sociology of emotions (Vol. 2)*. Springer.
- Stieglitz, S., & Dang-Xuan, L. (2013). Emotions and information diffusion in social media-sentiment of microblogs and sharing behavior. *Journal of Management Information Systems*, 29(4), 217-247. <https://doi.org/10.2753/Mis0742-1222290408>
- Szanto, T., & Landweer, H. (Eds.). (2020). *The Routledge handbook of phenomenology of emotion*. Routledge.
- Tappolet, C. (2016). *Emotions, values, and agency*. Oxford University Press.
- Thoits, P. A. (1989). The sociology of emotions. *Annual Review of Sociology*, 15, 317-342. <https://doi.org/10.1146/annurev.so.15.080189.001533>

- Thompson, R. A. (2019). Emotion dysregulation: A theme in search of definition. *Development and Psychopathology*, 31(3), 805-815. <https://doi.org/10.1017/s0954579419000282>
- Tomkins, S. S. (1962). *Affect imagery consciousness: The positive affects* (Vol. 1). Springer Publishing Company.
- Tomkins, S. S. (1962). *Affect imagery consciousness: The negative affects* (Vol. 2). Springer Publishing Company.
- Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology*, 11(4-5), 375-424. [https://doi.org/10.1016/0162-3095\(90\)90017-Z](https://doi.org/10.1016/0162-3095(90)90017-Z)
- Trevarthen, C., & Aitken, K. J. (2001). Infant intersubjectivity: Research, theory, and clinical applications. *Journal of Child Psychology and Psychiatry*, 42(1), 3-48. <https://doi.org/10.1017/s0021963001006552>
- Tronick, E. (2007). *The neurobehavioral and social-emotional development of infants and children*. W. W. Norton & Company.
- Tsai, J. L., Knutson, B., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology*, 90(2), 288-307. <https://doi.org/10.1037/0022-3514.90.2.288>
- Tsai, J. L., & Levenson, R. W. (1997). Cultural influences on emotional responding: Chinese American and European American dating couples during interpersonal conflict. *Journal of Cross-Cultural Psychology*, 28(5), 600-625. <https://doi.org/10.1177/0022022197285006>
- Turner, J. H., & Stets, J. E. (2005). *The sociology of emotions*. Cambridge University Press.
- Van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2010). An interpersonal approach to emotion in social decision making. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 42, pp. 45-96). [https://doi.org/10.1016/s0065-2601\(10\)42002-x](https://doi.org/10.1016/s0065-2601(10)42002-x)
- Vuilleumier, P. (2005). How brains beware: neural mechanisms of emotional attention. *Trends in Cognitive Sciences*, 9(12), 585-594. <https://doi.org/10.1016/j.tics.2005.10.011>
- Vuilleumier, P., Armony, J. L., Driver, J., & Dolan, R. J. (2003). Distinct spatial frequency sensitivities for processing faces and emotional expressions. *Nature Neuroscience*, 6(6), 624-631. <https://doi.org/10.1038/nn1057>
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548-573. <https://doi.org/10.1037/0033-295x.92.4.548>

Weiskrantz, L. (1956). Behavioral changes associated with ablation of the amygdaloid complex in monkeys. *Journal of Comparative and Physiological Psychology*, 49(4), 381–391. <https://doi.org/10.1037/h0088009>

Weiss, H. M., & Cropanzano, R. (1996). Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work. In B. M. Straw & L. L. Cummings (Eds.), *Research in Organizational Behavior* (Vol. 18, pp. 1-74). Elsevier Science/JAI Press.

Wierzbicka, A. (1986). Human emotions: Universal or culture-specific? *American Anthropologist*, 88(3), 584-594. <https://doi.org/10.1525/aa.1986.88.3.02a00030>

Wilson, T. D., & Gilbert, D. T. (2003). Affective forecasting. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, (Vol. 35, pp. 345-411). Academic Press. [https://doi.org/10.1016/s0065-2601\(03\)01006-2](https://doi.org/10.1016/s0065-2601(03)01006-2)

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, 35(2), 151–175. <https://doi.org/10.1037/0003-066X.35.2.151>