

1 The rise of *affectivism*

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66 Standfirst:

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

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

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

91 **Characterizing *affectivism***

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

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

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

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

120 **Developing affective sciences**

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

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

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

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

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

170 across cultures, and highlighting the influence of emotions as determinants of historical
171 action and thought.¹³

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

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

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

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

200 **A relevant and timely question**

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

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

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

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

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231 Total = 1992 words (with “standfirst”)

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264 **Author contributions**

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271 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
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274 **Competing interests**

275 The authors declare no competing interests.

276

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

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

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

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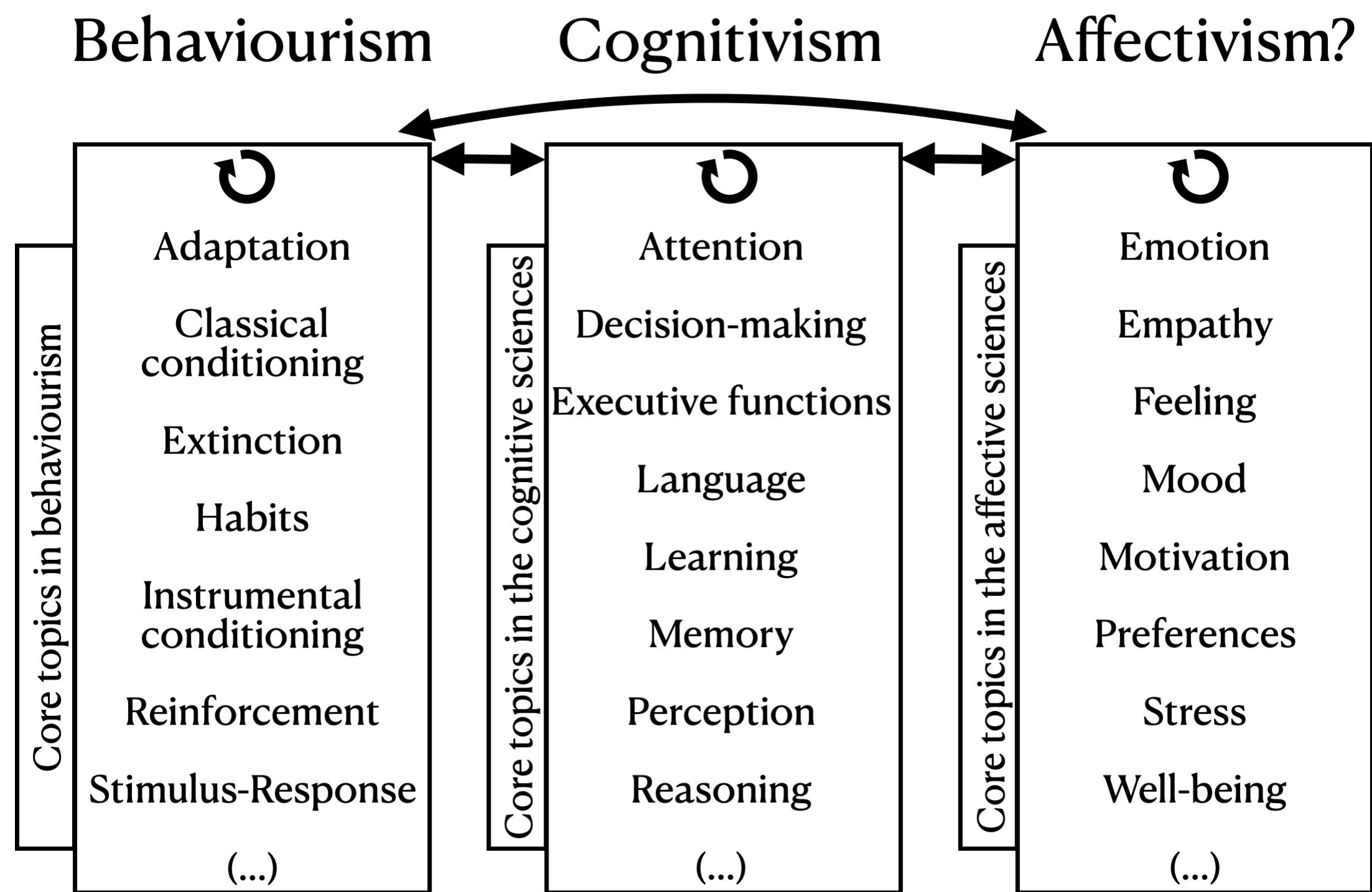
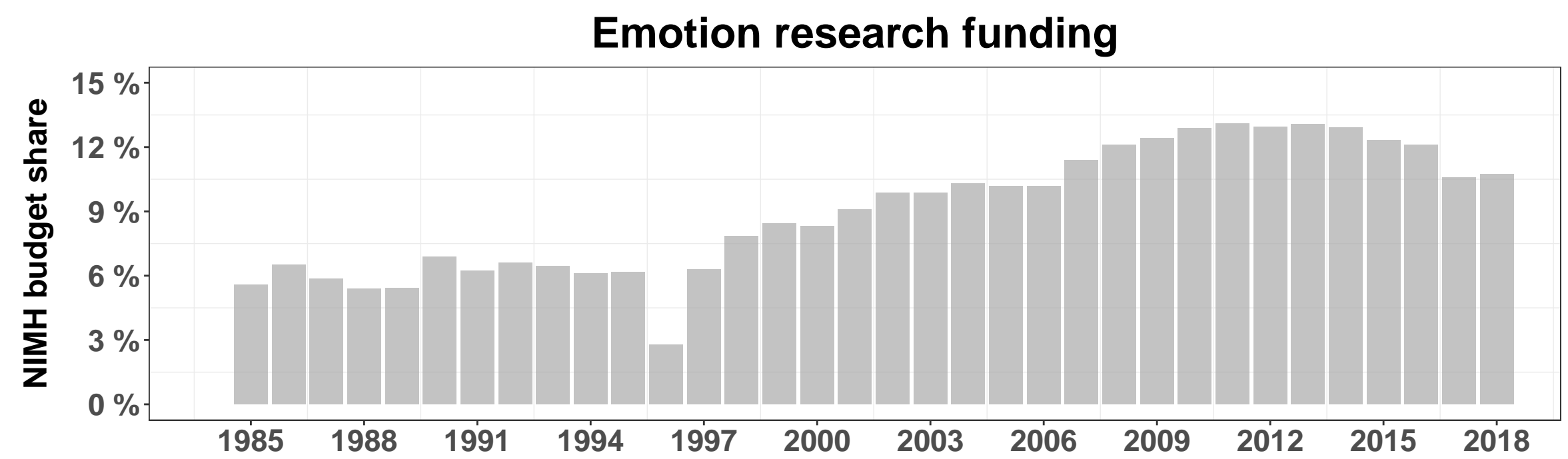
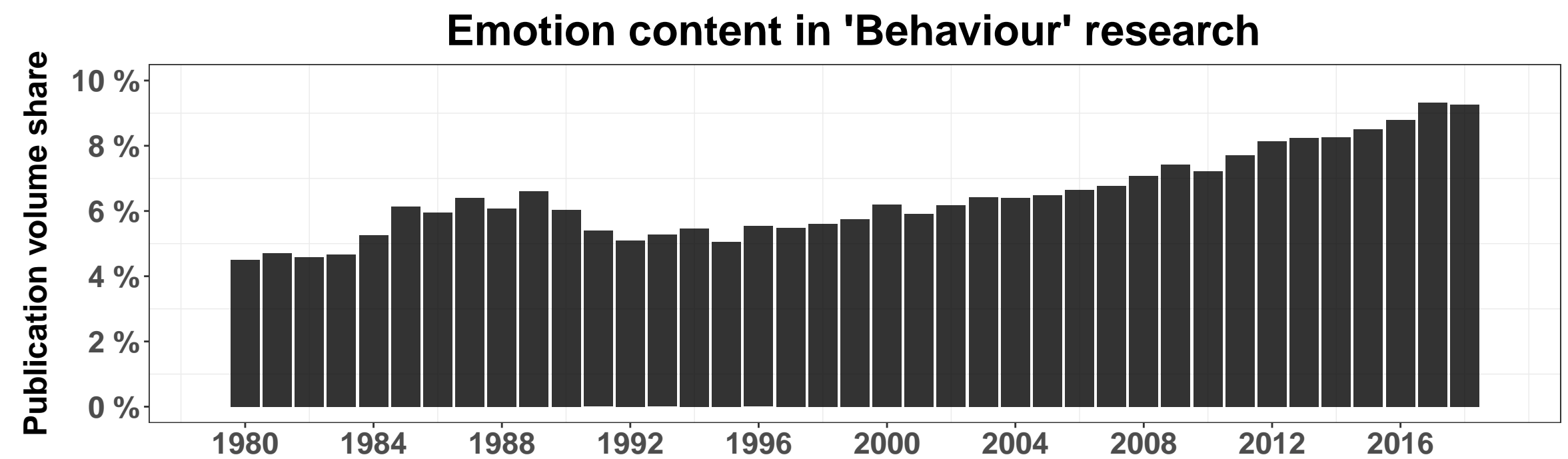
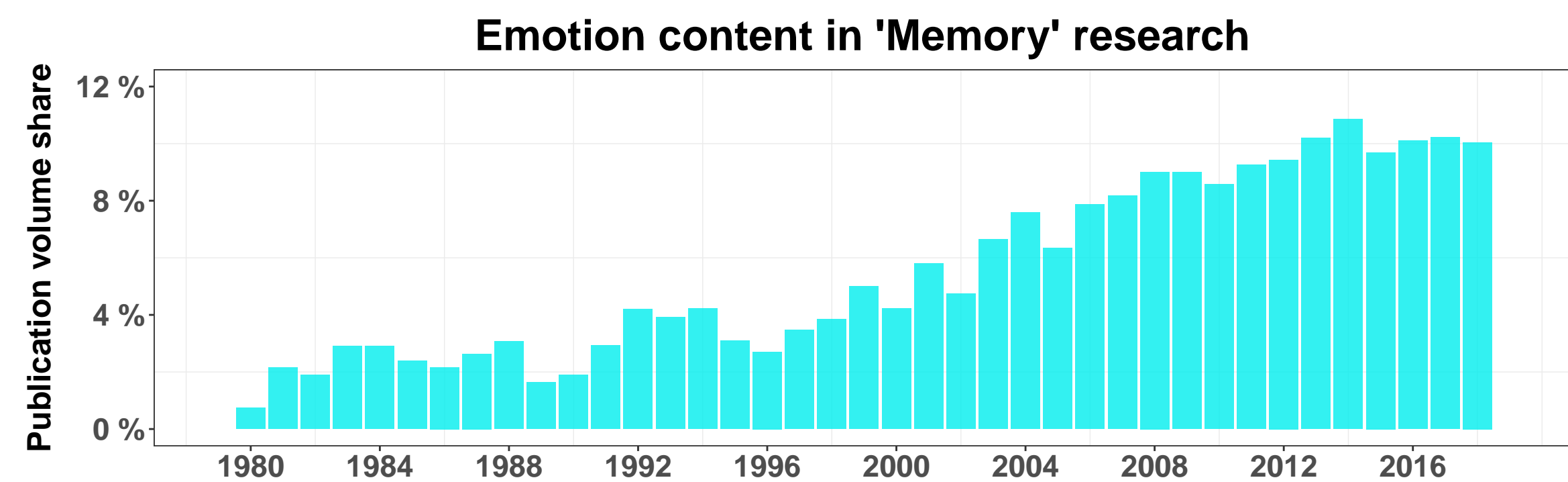
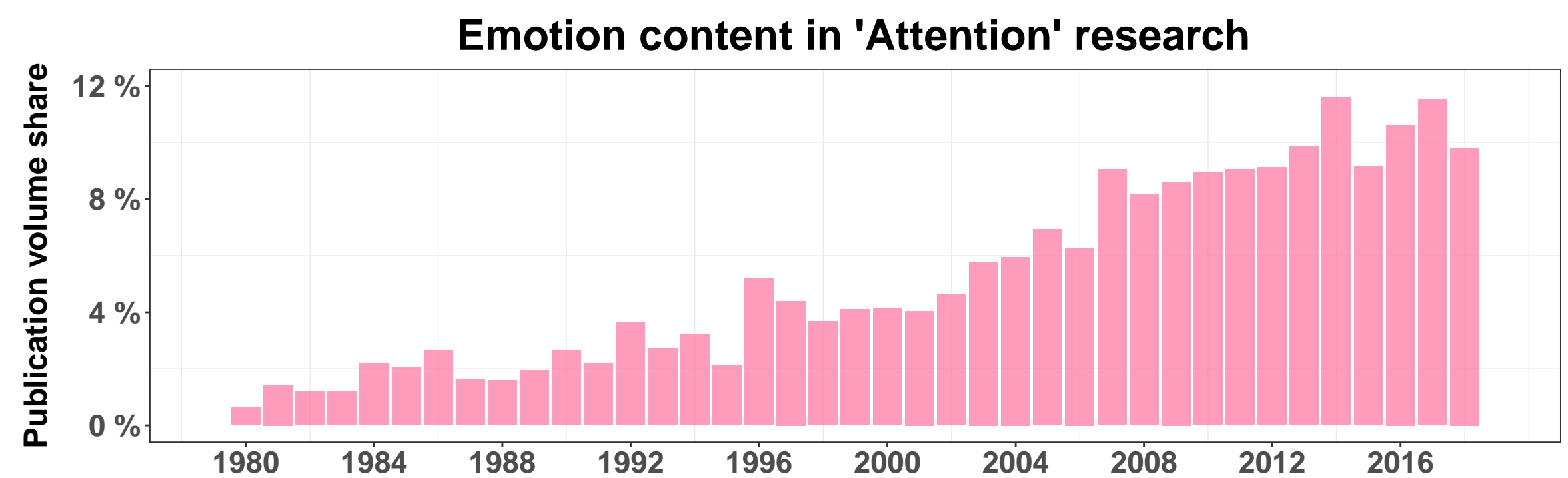
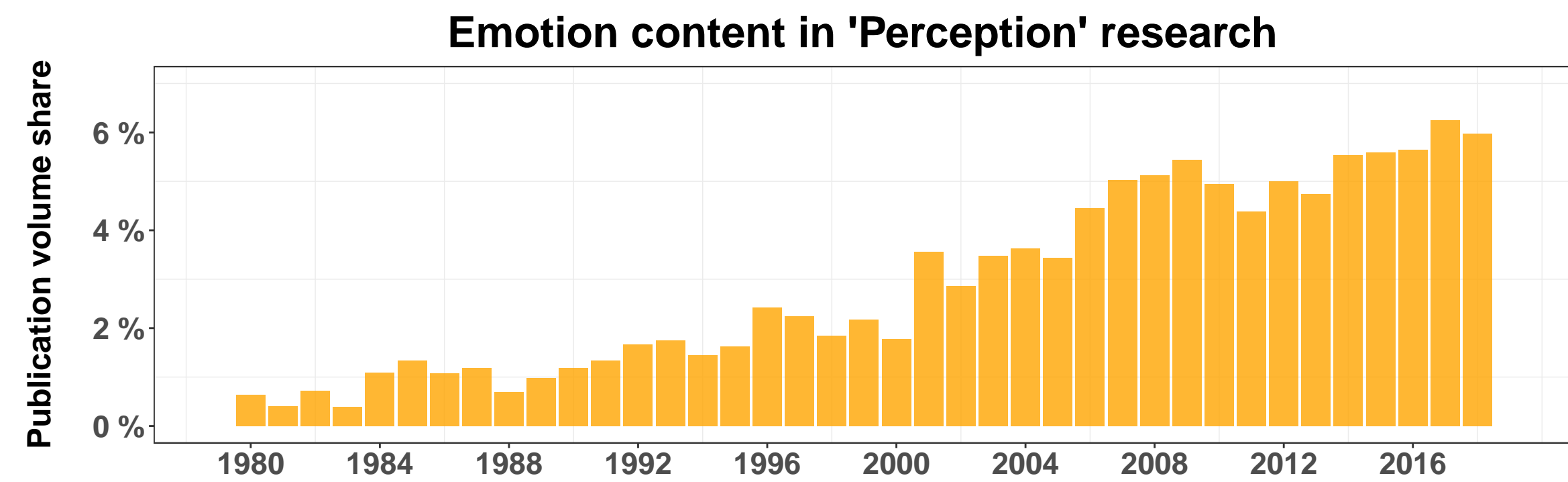
301 **Figure Caption**
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303 **Figure 1: The scope and increasing impact of the affective sciences**

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

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

a**b****c****d****e****f****g**