



Neuro-philosophy as both exposition and critique of cognitive neuroscience



Machiel Keestra, Institute for Interdisciplinary Studies, University of Amsterdam

Visions for Neurophilosophy

University of Munich, March 22, 2013



Contents

- Prologue: failed attempt at self-elimination of philosophy
- Methodological considerations: mechanistic explanation
- Example: action intentions
- Epilogue: neurophilosophy as exposition and critique



A peculiar vision for (neuro-)philosophy: self-elimination

Churchland:

- Both perception and concepts are products of sub-linguistically operating neural networks
- Philosophical problems depend on those products
- Redefine the problems in neural terms

Topoi (2006) 25: 29–32
DOI 10.1007/s11245-006-0024-z

Into the brain: where philosophy should go from here

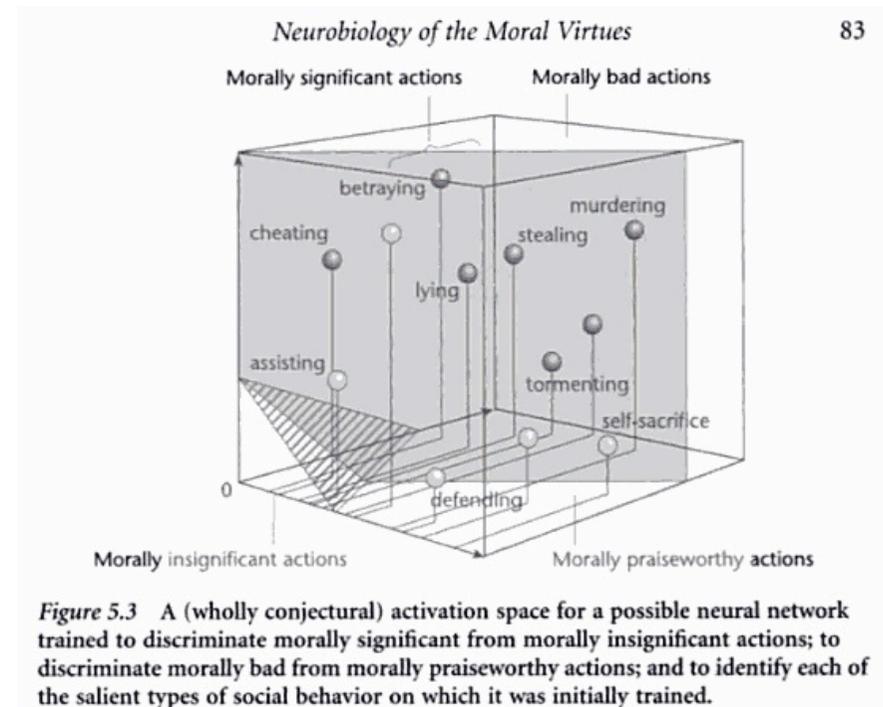
Paul M. Churchland



Moral philosophy – refer to moral skill learning?

“A person’s unique moral character is just the individual profile of his perceptual, reflective, and behavioral skills in the social domain.

(Paul Churchland, 1998, 89)





‘Ethos’ or ‘second nature’: Aristotle on learning ethical habits or skills

“We become just by doing just actions, temperate by doing temperate actions....

A state of character results from the repetition of similar activities”

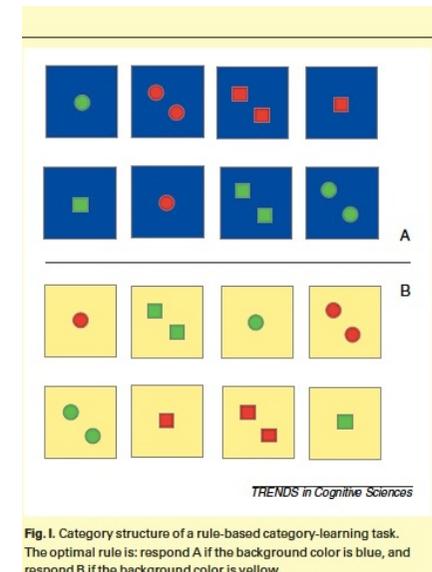
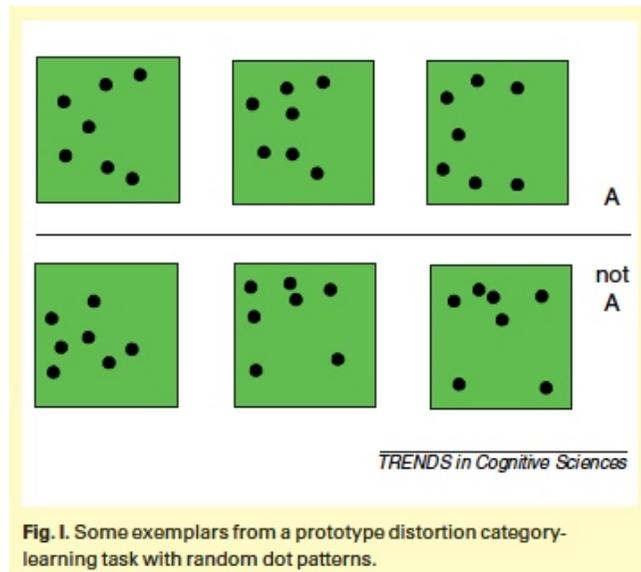
(Arist. Eth. Nic. 1103 a 35- b 22)





Complication: category and skill learning occur in (at least) two forms

- multi-dimensional, incremental prototype learning
- mono-dimensional rule learning



(Lea & Wills, 2008 Comp. cogn. behav. rev.

Keestra - Neurophilosophy Munich - 22 March 2013

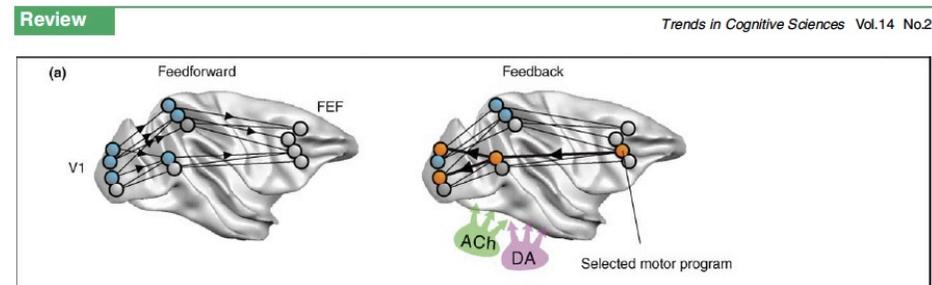
fig. Ashby & Ell, 2001 TICS)



Even in 'early' perception an interaction between multiple & feedback/feedforward processes

Feature-based attention influences perceptual grouping: frontal cortical feedback on V1 etc.

(Roelfsema, TICS 2009)





Embodied habitual/skilled action interact with rational rules in Aristotelian ethics.

“The part [of the soul] with appetites, and in general desires, shares in reason in a way.... in the way which we are said to ‘listen to reason’ from father or friends”

(Eth. Nic. 1102 b 30-34)



Contents

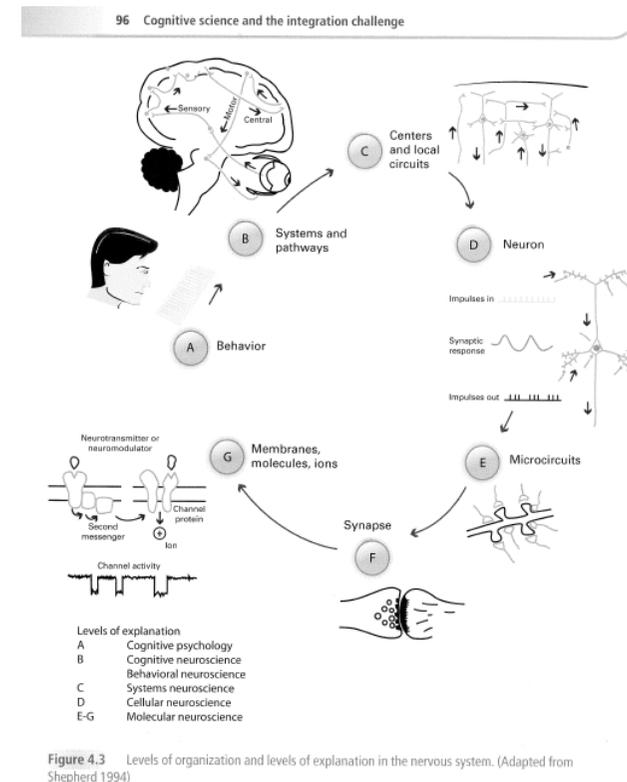
- Prologue: failed attempt at self-elimination of philosophy
- Methodological considerations: mechanistic explanation
- Example: action intentions
- Epilogue: neurophilosophy as exposition and critique



Interim conclusion: complex phenomena require a theoretical pluralism

- Relative significance of theories
- Pluralism between theories can be:
 - compatible
 - competitive

(Beatty, PoS 1997; Mitchell, Bio & Ph 2002; fig. Bermudez 2010)





Many types of explanatory questions

Explanations answer questions re 'intention X':

- What is X?
- What function has X for Y?
- What causes X?
- Why did agent Y at *t* intend X?
- Why did agent Y and not Z intend to X?
- What situation triggers X?

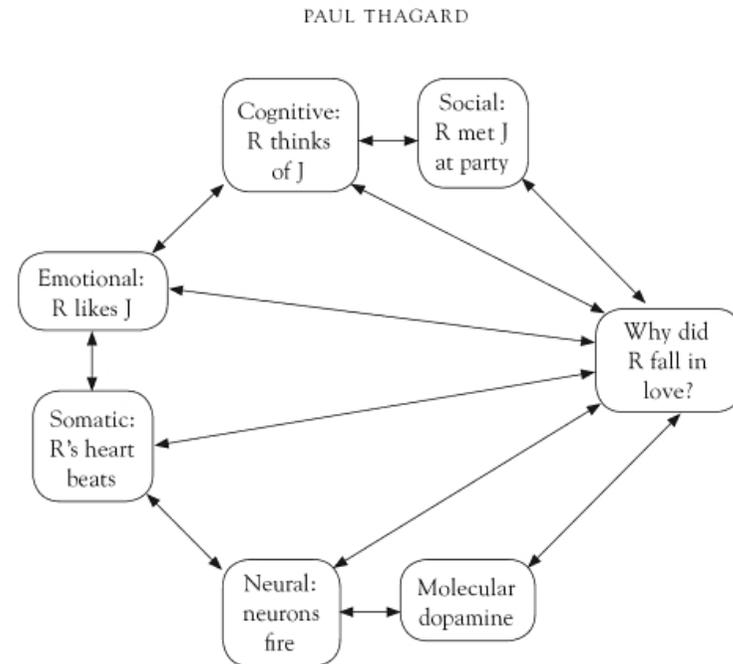


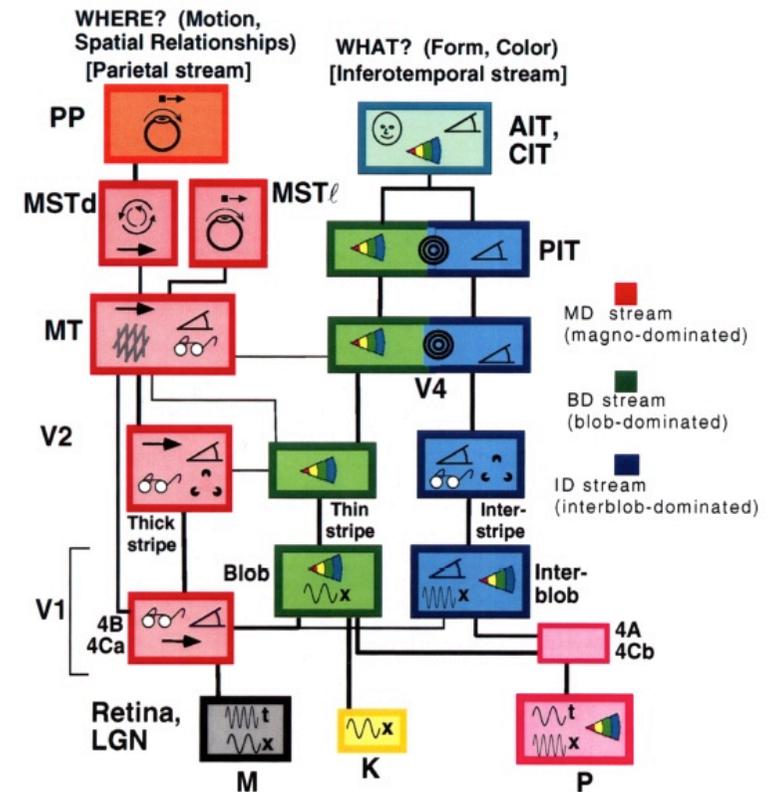
Figure 50.1 Sketch of a multilevel mechanistic explanation of why Romeo fell in love. A full causal picture would have more arrows.



Integrating theoretical pluralism by way of mechanistic explanation

- Definition of a function etc.
 - Decomposition of that function into components
 - Localization of (sub-components of) that function
- Reiteration of this process (including re-constitution of the phenomenon)

Review: Form and Motion in Primate Visual System
3





Mechanistic explanation: integration along multiple dimensions

- Levels of mechanism (systemic dimension)
- Levels of processing (temporal dimension)
- Levels of analysis (theoretical dimension)

(fig. Kallio & Revonsuo, 2003)

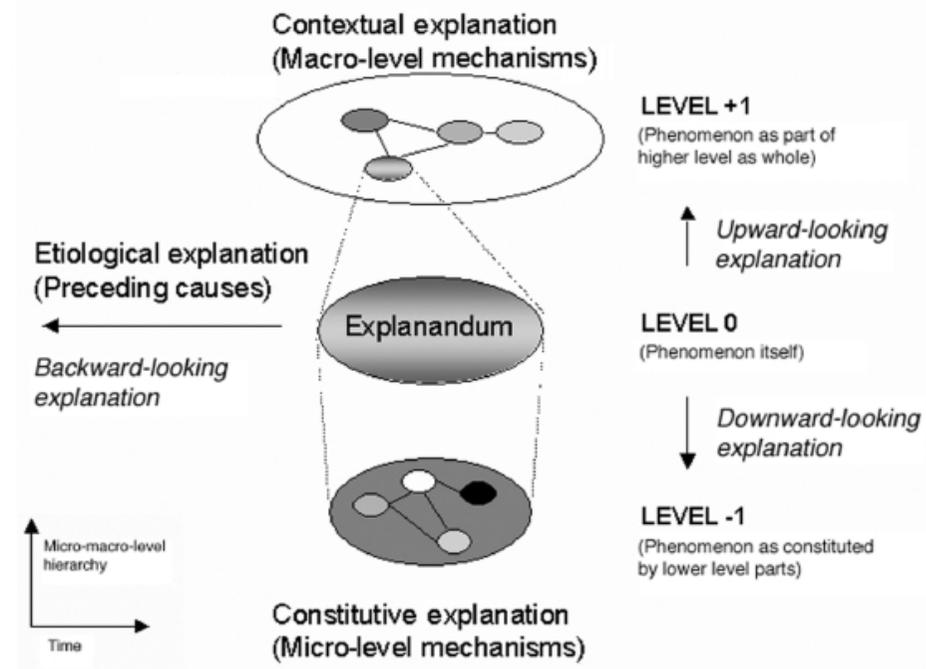


Figure 1. General scheme of multilevel framework of biological explanation.



Environmental information can become 'entrenched' in dynamical mechanisms

'Generative entrenchment' of
environmental information in
adaptive, dynamical mechanisms

(William Wimsatt, 1986 etc.)

Cf. 'Open' versus 'Closed' programs

(Ernst Mayr, 1971)





Contents

- Prologue: failed attempt at self-elimination of philosophy
- Methodological considerations: mechanistic explanation
- Example: action intentions
- Epilogue: neurophilosophy as exposition and critique



Decomposing intentional action: a pluralist & multi-level account

Multiple theories converge on distinctions between:

- distal (future oriented) intentions
- proximal (situated) intentions
- motor (implicit) intentions

(Model from Pacherie, Cognition 2008)

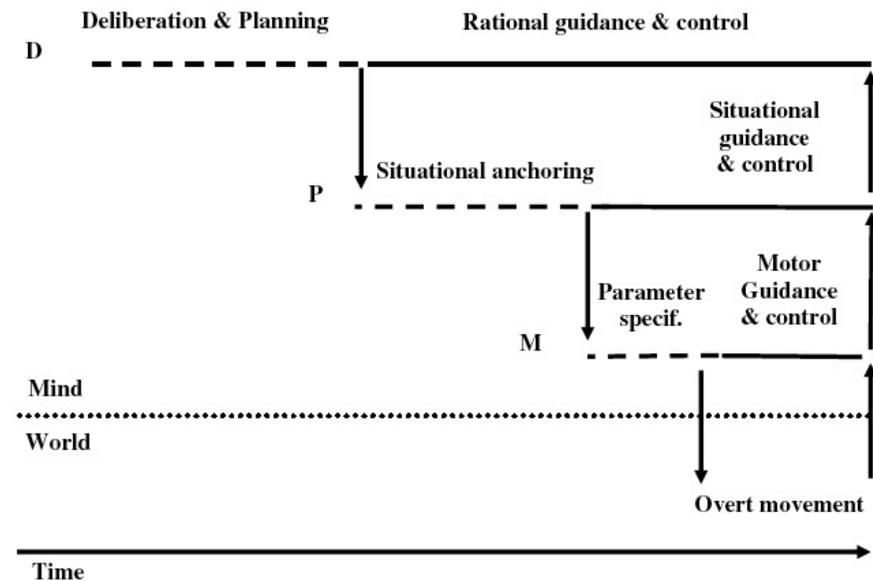


Fig. 1. The intentional cascade of D-intentions, P-intentions, and M-intentions.

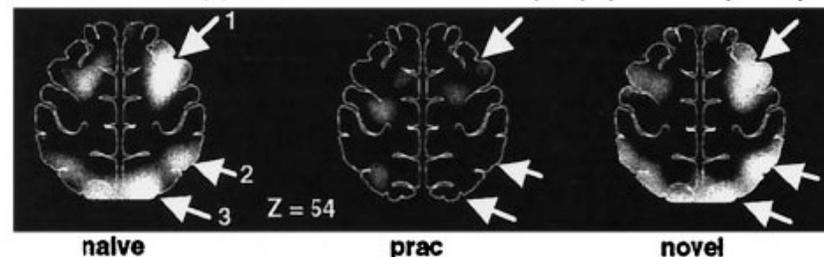


Motor intention: complex and dynamical

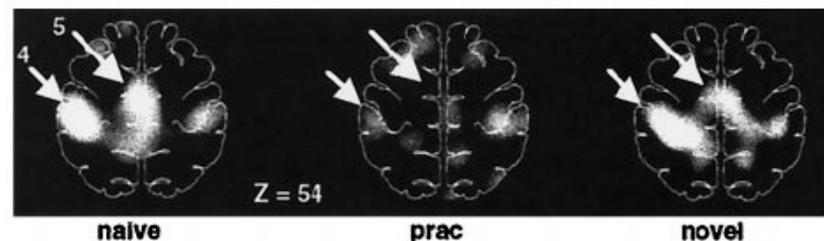
- motor representations contain both affordances and motor responses
- changing functional anatomy during skill learning:
 1. increasing neural efficiency
 2. increasing additional connectivity

(Petersen e.a. 1998)

R. PREMOTOR (1) AND PARIETAL AREAS (2, 3) (Maze - Sq. Fast)



PRIMARY MOTOR AREA (4) AND SMA (5) (Sq. Fast - Maze)



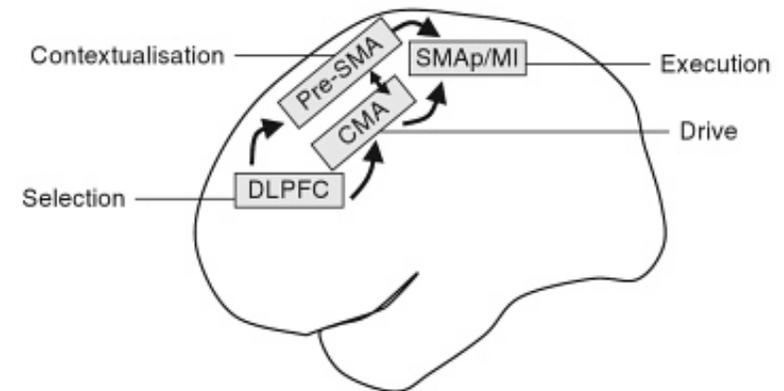


Proximal intention: mediating between distal & motor intentions

Component tasks of proximal intention:

- how to *anchor* or *specify* a distal intention?
- when to *inhibit* a habitual motor intention?

(~ Bratman, Intentions, plans... 1987;
fig. Pacherie & Haggard; Tribute to Libet, 2010)





Distal intentions and plans: the need for organizing and coordinating multiple intentions

Methodological priority of distal intentions:

- avoiding resource-consuming deliberations
- avoiding counter-productive actions

(Bratman, Searle, a.o.)

“However, almost nothing is known about how these long-range, prospective intentions connect to immediate, short-term intentions. Indeed, experimental studies of voluntary action deal hardly at all with the concept of prospective intention.”

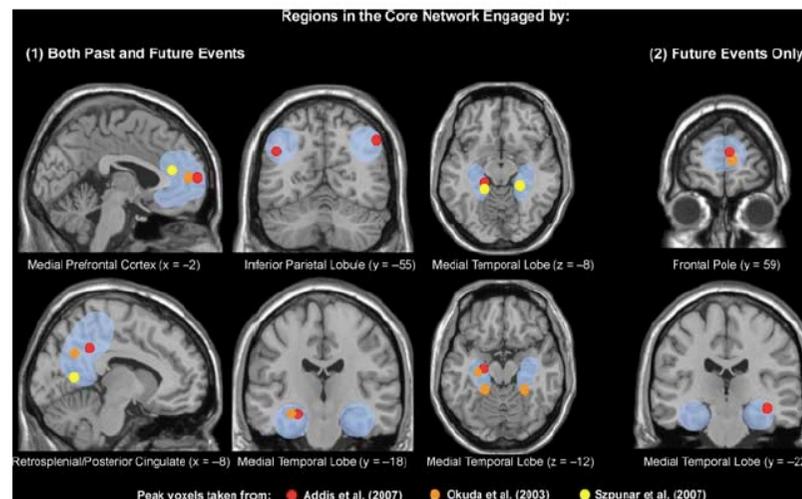
(Pacherie & Haggard, 2010)



Thickening the plot even more: narrative ‘simulation’ of distal intentions

Hermeneutic analysis of intention simulation:

- socio-cultural ‘paradigms’ for these simulations
- simulations are both sedimented & innovative



(Ricoeur, Oneself ... 1992; fig. Schacter e.a. Annals 2008)



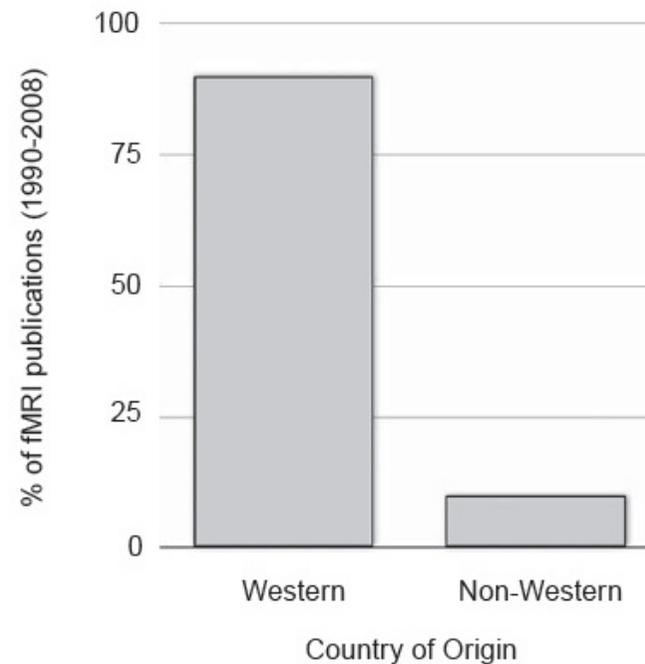
Given this, what is the implication of ~ 90% psychological & neuroimaging studies coming from the West?

October 2008 • American Psychologist

Table 1
National Affiliation of Journal Content, 2003–2007

Journal	Total	United States	English-speaking countries	Europe	Asia	Latin America	Africa	Middle East	Israel
First authors									
<i>Developmental Psychology</i>	461	331 (72%)	78 (17%)	41 (9%)	3 (1%)	0	0	0	8 (2%)
<i>Journal of Personality and Social Psychology</i>	698	457 (65%)	92 (13%)	123 (18%)	9 (1%)	0	0	0	17 (2%)
<i>Journal of Abnormal Psychology</i>	354	275 (78%)	44 (12%)	32 (9%)	2 (1%)	0	0	0	1
<i>Journal of Family Psychology</i>	313	265 (85%)	24 (8%)	18 (6%)	2 (1%)	0	0	0	4 (1%)
<i>Health Psychology</i>	408	319 (78%)	64 (16%)	23 (6%)	0	0	0	0	2 (1%)
<i>Journal of Educational Psychology</i>	297	197 (66%)	44 (15%)	37 (12%)	13 (4%)	1	0	0	5 (2%)
Total	2,531	1,844 (73%)	346 (14%)	274 (11%)	29 (1%)	1	0	0	37 (1%)
Other authors									
<i>Developmental Psychology</i>	1,091	739 (68%)	212 (19%)	114 (10%)	18 (2%)	1	2	0	5
<i>Journal of Personality and Social Psychology</i>	1,495	1,026 (69%)	186 (12%)	229 (15%)	31 (2%)	2	0	0	21 (2%)
<i>Journal of Abnormal Psychology</i>	1,032	773 (75%)	139 (13%)	109 (11%)	6 (1%)	2	0	0	3
<i>Journal of Family Psychology</i>	756	625 (83%)	63 (8%)	55 (7%)	3	2	0	0	8 (1%)
<i>Health Psychology</i>	1,313	1,061 (81%)	156 (12%)	86 (7%)	6	0	0	0	4
<i>Journal of Educational Psychology</i>	607	408 (67%)	83 (14%)	79 (13%)	27 (4%)	4 (1%)	0	0	6 (1%)
Total	6,294	4,632 (74%)	839 (13%)	672 (11%)	91 (1%)	11	2	0	47 (1%)
Samples									
<i>Developmental Psychology</i>	466	299 (64%)	87 (19%)	51 (11%)	17 (4%)	5 (1%)	1	1	5 (1%)
<i>Journal of Personality and Social Psychology</i>	721	450 (62%)	84 (12%)	135 (19%)	30 (4%)	4 (1%)	4 (1%)	0	14 (2%)
<i>Journal of Abnormal Psychology</i>	334	243 (73%)	45 (13%)	38 (11%)	6 (2%)	1	0	0	1
<i>Journal of Family Psychology</i>	273	220 (81%)	21 (8%)	22 (8%)	3 (1%)	1	0	1	5 (2%)
<i>Health Psychology</i>	371	281 (76%)	57 (15%)	29 (8%)	2 (1%)	1	0	0	1
<i>Journal of Educational Psychology</i>	287	184 (64%)	41 (14%)	36 (13%)	20 (7%)	1	0	0	5 (2%)
Total	2,452	1,677 (68%)	335 (14%)	311 (13%)	78 (3%)	13 (1%)	5	2	31 (1%)

Note. English-speaking countries are the United Kingdom, Canada, Australia, and New Zealand. Percentages are shown except when the percentage was less than one half of one percent.



Arnett, 'Neglected 95%', Am. Psychologist 2008; Chiao, 'Cultural neuroscience', 2009)



Contents

- Prologue: failed attempt at self-elimination of philosophy
- Methodological considerations: mechanistic explanation
- Example: action intentions
- Epilogue: neurophilosophy as exposition and critique



Neuro-philosophy: Darstellung und Kritik?

- conceptual analysis
- methodological clarity
- interpretation of results
- reflection upon (ethical etc.) implications