

Final Draft zu: Nungesser, Frithjof (2017): "The Evolution of Pragmatism. On the Scientific Background of the Pragmatist Conception of History, Action, and Sociality", in: *European Journal of Sociology/Archives Européennes de Sociologie/Europäisches Archiv für Soziologie*, Vol. 58, Issue 2, 2017, S. 327-367. (DOI: 10.1017/S0003975617000121)

The Evolution of Pragmatism: On the Scientific Background of the Pragmatist Conception of History, Action, and Sociality

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On the negative side, the pragmatic movement is developed by various deadlocks into which modern thought has run, thereby necessitating a reconsideration of fundamental premises. On the positive side, it grows out of the development of experimental methods and of genetic and evolutionary conceptions in science.
(Dewey 2008 [1908]: 253)

The Darwinian Revolution posed a radical challenge not only to biological thought but also to cosmogonical narratives, religious dogmas, and human self-conceptions. It triggered a break in intellectual history that also affected philosophy, psychology, and the social and cultural sciences. This was especially true in the United States, where the reception of Darwin's work was much more diverse than it may often seem in retrospect. Of course, Darwin's work was interpreted as being proof of racist and eugenic outlooks, and he was declared to be the patron saint of social Darwinism, which became particularly popular in the United States in the last three decades of the 19th and early 20th centuries. However, various alternative interpretations of Darwin's thought rivaled social Darwinism from the beginning. In particular, proponents of American Progressivism took the perspectives that Darwin's work was proof of the plurality of life-forms, that intelligence and

rationality develop in the course of evolution, and that emancipatory change and social progress were possible.¹

As other intellectual movements that took their forms in the second half of the 19th century, pragmatism can be seen as the result of a specific interpretation of Darwin's theory of evolution. Darwin's work was a seminal influence for Charles Sanders Peirce and William James just as for John Dewey and George Herbert Mead – not only intellectually but also biographically. Each of the classical pragmatists perceived Darwin's thought as the climax of a fundamental scientific revolution, which irretrievably destroyed traditional ways of thinking.

The main claim of this paper is a historical one. I will argue that the genesis of the pragmatist conceptions of history, action, and sociality can only be understood if we take their connection to the scientific debates of the time into account, especially in terms of evolutionary theory and biology. Several pragmatists already became familiar with scientific developments within the family. For all of them, scientific training was an important part of their educational biographies, and the constant dialogue with the life sciences remained a major influence on their thinking.²

¹ For the early reception of Darwin's work in the United States in general, see Hofstadter (1955), Pfeifer (1988), Degler (1991), and Numbers (1998). For the influence of the theory of evolution on the early social sciences, cf. Leeds (1988) and Schubert (1995: 108ff.). See Hofstadter (1955) as well as Degler (1991) for the history of social Darwinism and Geiss (1988: 141ff., 158ff.) as well as Gould (1996 [1981]) for the history of eugenics and racial anthropology. It is important to see that, quite often, no clear distinctions can be drawn between different 'camps'. For example, many progressivist thinkers such as the sociologist Edward Ross not only fiercely criticized social Darwinism but also developed racist and eugenic arguments (cf. Geiss 1988: 176ff.; Degler 1991: 16ff.).

² This is quite obvious in the case of *Peirce*, who was introduced to many scientific areas early on in life by his father, the important mathematician and astronomer Benjamin Peirce. Charles Peirce studied chemistry at Harvard University and later made important contributions to such diverse fields as logic, stochastics, geodesy, and astronomy (cf. Menand 2001: 151ff.). Although, in contrast to Peirce, none of the other classical pragmatists was "professionally a practicing scientist" (Apel 1975: 23), all of them were deeply impressed by the scientific breakthroughs of the time. In 1861, *James* began to study chemistry at Harvard just as his childhood friend Charles Peirce had. However, after a few semesters, he decided to study medicine instead. Following his graduation in 1869, he entered the faculty at Harvard in 1872. At first, James taught classes in anatomy and physiology. However, the psychological questions connected to these fields gradually became the central topic of his thought (cf. Stern 1965: 180ff.). From the mid-1870s and on, James introduced the discipline of physiological psychology into American science with which he had become well acquainted during his stay in Germany in the years 1867/68, (cf. Perry 1996 [1948]: 81ff.). James repeatedly emphasized that his only professional training was in medicine. Therefore, he thought of himself as a self-educated psychologist and philosopher (cf. e.g., Perry 1996 [1948]: 78). *Dewey*, again, was deeply impressed by G. Stanley Hall's classes in psychology, which he took during his graduate studies at Johns Hopkins University (cf. Coughlan

Darwinian evolutionary theory was of special importance in this context since it served as a kind of ‘intellectual funnel.’ This ‘funnel’ not only allowed each of the pragmatists to synthesize various theoretical insights and personal beliefs but also contributed to intellectual convergence among the different pragmatists. Such a convergence was in no way predictable since the classical pragmatists adhered to different philosophical doctrines, identified with different disciplines and research topics, and differed in their moral and political outlooks.³ Because of this ‘funnel effect,’ the reception of Darwin seems to be an ideal guideline that can allow us to understand the genesis of pragmatism.⁴

1975: 48f.). “Dewey had taken all of Hall’s courses, including ones in physiological, experimental, and theoretical psychology and ‘scientific pedagogies’ and had concluded independent experiments on attention in Hall’s laboratory.” (Hahn 2008 [1968]: xxx) – Just as James, *Mead* had also become fascinated by physiological psychology during his three-year stay at German universities (Leipzig and Berlin) (cf. Joas 1985 [1980]: 17ff.; Huebner 2014: 42ff.; Pearce 2016). Hall also played an important role for him (cf. Cook 1993: 20ff, 32ff.). Mead conducted his own laboratory experiments and offered classes in comparative and physiological psychology (cf. Cook 1993: 43f., 200; Joas 1985 [1980]: 20; Huebner 2014: 52ff.). Moreover, before he enrolled in the philosophy program at Harvard University, Mead worked in railroad construction for three years. “This first-hand experience of the technical application of the natural sciences reinforced his life-long openness to all developments in this area”. (Joas 1985 [1980]: 16; also Miller 1973: xiii). Even in 1910, while developing his path-breaking social psychology, Mead characterized his main research interests in the volume *American Men of Science* as follows: “Relation of philosophy to the natural sciences; comparative psychology. — The criterion of intelligence in lower forms.” (Mead 1910a) Later, the impact of the natural sciences on Mead’s thought was also enormous, as can be seen by his reception of the theory of relativity (cf. Joas 1985 [1980]: 167ff.). In short: “Mead’s philosophy bears the imprint over and over of having been in contact with rigorous scientific investigation.” (Huebner 2014: 60)

³ In this paper, I will focus on the similarities and agreements between the classical pragmatists. Thereby, I do not imply that pragmatism can be thought of as a homogenous intellectual tradition. We can already identify substantive differences between the two founding figures, Peirce and James (cf. e.g., Perry 1996 [1948]: Ch. XXXI, Thayer 1981: 79f., Menand 2001: 362ff.). In addition, no efforts that are usually connected to the institutionalization of a ‘school of thought’, such as the publication of an authoritative program or the founding of a journal or a pertinent research organization have been undertaken (cf. e.g., Moebius 2015: 119). Finally, the concept of ‘the classical pragmatists’ is itself the result of a complex and conflictive process of reception and canonization. According to Daniel Huebner, “materials that [Charles] Morris prepared for the original book jackets of the posthumous Mead volumes [published in the 1930s; FN] are, as far as I can tell, the first significant documentary source for the proposition that Mead, Peirce, James, and Dewey were to be considered the definite set of American pragmatist philosophers.” (Huebner 2014: 154).

⁴ Of course, this is not the only possible guideline for the historical reconstruction of pragmatism. One could focus on the history of religion and philosophy or the radical social, political, and technological changes in the United States. One could concentrate on the transformation of the American system of education and research at the time or on the local contexts and family histories. These alternative reconstructive guidelines have been used in several important studies (cf. esp. Mills 1966; Thayer 1981; Kloppenberg 1986; Menand 2001), and crucial insights from these perspectives will be integrated in the following analysis.

In the following text, I will reveal this *historical claim* in three steps. First, I will show why Darwin's theory was so attractive to the classical pragmatists, and how their view on *natural evolution and historical contingency* was affected by their reading of Darwin (first section). Second, I will outline how the pragmatist understanding of *individual agency* was influenced by contemporary discussions in evolutionary theory, physiology, and psychology (second section). Third, I will illustrate how the pragmatists used evolutionary theory to develop a naturalist and non-reductionist account of the emergence of an autonomous *sociocultural level of historical openness*. I will argue that on all of these three levels – natural evolution, individual agency, and sociocultural history – the pragmatist understanding of evolution differs radically from both the social Darwinist and progressivist perspectives. In addition, I will show how these three levels of change are connected in pragmatist thought. Individual agency and sociocultural history emerge not only as relatively autonomous processes in the course of evolution. Moreover, the evolution of cultural forms of thought has finally led to the self-reflexive understanding of evolution. This is to say that biological evolution has led to the emergence of self-reflexive agency and cultural history, while self-reflexive agency and cultural history have allowed for the development of an awareness of evolutionary change (third section).⁵

The reconstruction of pragmatist evolutionary thought that will be presented in this paper not only aims to achieve a better historical understanding but also implies a *systematic and theoretical claim*. As I will argue in the last section, the *continuing relevance of pragmatism* is largely due to the fact that it took shape in a transdisciplinary context and remained an “empirically responsible” theory (Kilpinen 2013: 9). While this transdisciplinary orientation retreated into the background during substantial parts of the reception of pragmatism,⁶ it has been rediscovered

⁵ During the course of the first three sections, the focus of the paper will gradually shift from ‘Cambridge’ to ‘Chicago.’ In the first section, I will focus on James’s and Peirce’s receptions of Darwin, the second section is primarily concerned with James’s functional psychology but also considers the psychological accounts of the other pragmatists. In the third section, Dewey and Mead will be the protagonists, since social psychology, social change, and social reform play a much more important role in their works (cf. Baldwin 1986: 10; Joas 1993 [1992]: 20).

⁶ Cf. Baldwin (1986: 154f.), Franks (2010: 1f., 2013, 139f.) and Solymosi (2013:93). The sociological reception of pragmatism, for example, was quite selective for a long time. This was largely due to Herbert Blumer’s interpretation of Mead as the founding figure of “symbolic interactionism.” While the interactionist tradition was of crucial importance for the continuing reception of Mead,

in recent years. Currently, various developments in psychology, the cognitive sciences, neurophysiology, and ethology are connected with pragmatist arguments. A positive as well as critical reception of these developments can pave the way to an updated version of pragmatism (final section).⁷

Evolution, contingency, and intellectual liberation

In 1909, fifty years after the publication of Darwin's groundbreaking work, Dewey wrote that *On the Origin of Species* not only "marked an epoch in the development of the natural sciences" but also "embodied an intellectual revolt and introduced a new intellectual temper" (Dewey 1998 [1909]: 39). The very title of Darwin's book pointed towards the shocking implications of his theory. 'Species' were characterized as the (intermediate) products of natural history. This constituted a fundamental break in Western intellectual history, which had considered species as given, unchangeable, and timeless since antiquity (cf. Dewey 1998 [1909]: 39; Mead 1936a: 161).⁸ If one examines the writings of the pragmatists, it becomes obvious that they interpreted Darwin's theory as containing a liberating potential, which could help them overcome the intellectual traditions that were perceived as paralyzing, constrictive, and sterile. By taking an evolutionary view, it seemed, old problems could be left behind and new perspectives could be opened up.⁹

it also led to the marginalization of essential aspects of Mead's work such as the significance of the body and the constitutive role of biology, physiology, or animal psychology. For the selectivity of Blumer's interpretation of Mead, see, for example, Joas (1993 [1992]: 16ff.) and Kilpinen (2013: 3f.)

⁷ Already in 1908, A. C. Armstrong published a paper titled "The Evolution of Pragmatism." Armstrong analyzed the philosophical developments that were triggered by the criticisms of the early pragmatist writings. These criticisms, he argued, led to a much needed clarification of the pragmatist doctrine as well as to a better understanding of the differences between the pragmatists (he referred to James, Schiller, and Dewey). "As method, then, as epistemology, in its metaphysics, pragmatism is evolving. Integration and differentiation have both been taking place." (Armstrong 1908: 650) As will be shown in this paper, this evolution of pragmatism is still ongoing.

⁸ The radical character of this break is described in detail in Arthur O. Lovejoy's study on *The Great Chain of Being* (cf. Lovejoy 1936).

⁹ See, for example, the papers Dewey and Mead wrote on the occasion of the 50th anniversary of the publication of Darwin's *On the Origin of Species* (Dewey 1998 [1909]; Mead 1909 – published only posthumously). For the pragmatist reception of evolutionary theory in general, see Wiener (1972 [1949]) and Hofstadter (1955: Ch. 7). For Peirce's interpretation of Darwin, cf. Wiener (1972 [1949]: Ch. IV), Menand (2001: 364f.); for James see Wiener (1972 [1949]: Ch. V), Myers (1986: 589ff.), Menand (2001: 117ff.); for Dewey, cf. Coughlan (1975: 7f., 51f.), Westbrook (1991:

Unlikely Darwinism

The fact that Darwin's model of evolution is one of the best substantiated theories today in science should not obscure the fact that the pragmatists' enthusiasm for Darwin's writings was exceptional. Of course, the idea of evolution itself was by no means new at the time. It has already been debated during the decades before the publication of *On the Origin of Species* (cf. Mayr 1982: 343-93). This discussion intensified in the United States in the years after the Civil War due to the publication of Darwin's study. Historical studies agree that in the middle of the 1870s, the bulk of natural scientists in the US were convinced that evolutionary processes had occurred. However, the discussions on Darwin's book did not lead to an acceptance of Darwin's theory.¹⁰ Already in 1871, Chauncey Wright – a childhood friend of Peirce and James and co-founder of the *Metaphysical Club* – described the emerging paradox:

Orthodoxy has been won over to the doctrine of evolution. [...] Mr. Darwin has won a victory, not for himself, but for Lamarck. Transmutation, it would seem, has been accepted, but Natural Selection, its explanation, is still rejected by many converts to the general theory, both on religious and scientific grounds. (Wright 1877 [1871]: 126, 128)

In fact, not only Lamarckist but also theistic, orthogenetic, and saltationist theories of evolution were interpreted as being compatible with the traditional religious narrative of natural history. However, the same did not apply to Darwin's model of natural selection. Because it implies an irreducible element of chance, natural selection was considered to be inconsistent with a directed and planned development of species (cf. Pfeifer 1988: 182, 191f., 201ff.).¹¹ The result of this

65ff.), Campbell (1991: 26ff.); for Mead cf. Joas (1985 [1980]: 15, 34f., 53f.), and Farr (1996: 54ff.).

¹⁰ As in the cases of other scientific revolutions, the rejection of the Darwinian model of evolution is often presented from a 'Whiggish' perspective. Accordingly, disapproval of Darwin is frequently characterized as being solely of an 'ideological' or 'irrational' nature. Undoubtedly, numerous criticisms were due to religious or political reservations. However, this does not change the fact that many objections to Darwin's theory arose from theoretical inconsistencies or a lack of empirical data. For example, Darwin could not provide a convincing explanation for genetic variation because Mendel's *Versuche über Pflanzenhybriden* (*Experiments on Plant Hybridization*), published in 1866, remained largely unknown until the turn of the century (an unread print of Mendel's work was found in Darwin's library after his death) (cf. Mayr 1982: 119f.).

¹¹ Although today's debates such as the one on creationism perhaps suggest that Christian religion and science exclude one another or that their relationship is inherently conflictive, the early debates on evolution presented a different picture. Especially in the United States, the Protestant critique of merely speculative and metaphysical subjects led to the affirmation of the tangible,

peculiar reception of Darwinian evolutionary theory in the United States was that, until the turn of the century, few scientists could be characterized as defenders of Darwin *and* proponents of the Darwinian theory of evolution (cf. Numbers 1998: 43f.).¹²

Against this background, it is remarkable that William James and Charles Peirce decidedly sided with Darwin. For example, as early as 1865 – at the age of 23 – James wrote mostly positive reviews of texts written by Thomas Huxley and Alfred Wallace (James 1987a [1865]; 1987b [1865]). Already in these reviews – his very first publications – his support for Darwin can be discerned (cf. Skrupskelis 1987: xxii). In subsequent publications, his Darwinian stance was substantiated (cf. James 1987 [1868]; 1950b [1890]: 683ff.). Darwin’s theory was also an intellectual turning point for Charles Sanders Peirce. In his eyes, it initiated “the greatest mental awakening since Newton and Leibniz” (Peirce cited in Brent 1998: 60). In Peirce’s highly complex theoretical framework, evolution is a far-reaching concept that synthesizes cosmological, logical, semiotic, and biological considerations. Therefore, his evolutionary thinking cannot be identified with a Darwinian position alone. On the biological level, however, Peirce, like James, was an early proponent of the primacy of natural selection. Also, Peirce regarded Darwin’s theory as making a significant contribution to the transition from deterministic to probabilistic theories (cf. Apel 1975: 274; Brent 1998: 60). Finally, Peirce based his evolutionary epistemology, according to which the perception of the world is the result of the long-term selection of psychological mechanisms, on Darwin’s theory (cf. e.g., Peirce 1992 [1878]: 181f.).

Several characteristics specific to James’s and Peirce’s generation and milieu certainly contributed to their early and determined support of Darwin.¹³ Like other

empirical, and practical subjects (cf. Taylor 1989: 212ff.). Among other things, this led to the appreciation of scientific and technical knowledge. It was only Darwin’s doctrine that was regarded as incompatible with the idea “that the world order in its totality is, could, and should somehow be a meaningful ‘cosmos’” (Weber 2014 [1915]: 281).

¹² This is an important distinction since there were, of course, early defenders of Darwin in the United States such as the influential botanist Asa Gray. However, despite his support for Darwin, Gray advanced a theistic interpretation of evolution (cf. Numbers 1998: 27).

¹³ For the importance of age, milieu, and family structure for the acceptance of evolutionary concepts see Numbers (1998: 44ff.).

members of the *Metaphysical Club*,¹⁴ during the early debate on Darwinism, James and Peirce were part of an emerging generation that did not have to abandon any beliefs that were deep-seated or even constitutive to their identities by supporting Darwin.¹⁵ Moreover, they grew up in a New England environment that can be understood as liberal in the sense that the reconciliation of science and religion was regarded as desirable. Plausible scientific insights were not overlooked in favor of religious doctrines. The development of James's and Peirce's anti-institutionalist and idiosyncratic interpretations of Christianity was also made possible within this milieu.¹⁶

In addition, we have to factor in a specific local effect. Paradoxically, it seems as though the important Swiss-American biologist Louis Agassiz – “the most famous of the many enemies of Charles Darwin” (Menand 2001: 95) – contributed to Peirce's and James's Darwinism. Agassiz taught both James and Peirce at Harvard University (cf. Perry 1996 [1948]: 67ff.; Richards 1987: 424f.; Menand 2001: 97ff., 156ff.). The intense and highly critical examination of Darwin's theories that took place in

¹⁴ The *Metaphysical Club* was an informal discussion circle in Cambridge in the 1870s, in which intensive debates were held on philosophical and scientific topics (cf. esp. Menand 2001). It can be regarded as the cradle of pragmatism. In addition to James and Peirce, the group included John Fiske, Oliver Wendell Holmes Jr., Francis Ellingwood Abbot, Nicholas St. John Green, and especially Chauncey Wright, who can be seen as the “pivotal figure” (Menand 2001: 205) of the circle. Wright also had a decisive influence on the evolutionary thought of his friends James and Peirce. Wright had already died by 1875, which is why he could influence the debate on Darwin only briefly (for Wright's life and thought, see Perry 1996 [1948]: 127ff., Wiener 1972 [1949]: 31ff., and Menand 2001: 201ff.).

¹⁵ At the time of the publication of Darwin's *Origin*, Peirce was 20 years old, William James was only 17. The other members of the *Metaphysical Club* were between 17 and 29 years old (Wright was the oldest member). For the generation-specific factors that influenced the Club's members but also for the differences between their family milieus, see Mills (1966: 84ff.).

¹⁶ The Peirces were Unitarians (i.e., members of a rational and rather liberal denomination which believes in the coexistence of science, reason, and faith) (cf. Brent 1998: 19). In 1862, Charles Peirce became a member of an episcopal congregation. Thereby, he converted to a Trinitarian denomination, which also made it possible for him to combine his religious convictions with his theory on signs (cf. Fisch 1982: xxxff.). Overall, however, Peirce adhered to an idiosyncratic interpretation of Christian doctrine all his life. After a long spiritual search, Henry James Sr., William James's father, became a follower of Swedenborg in the mid-1840s. However, Henry Sr. interpreted his new faith quite freely (cf. Perry 1996 [1948]: 5ff.). Thus, according to Ralph Barton Perry, William James “grew up in a circle in which heresies were more gladly tolerated than orthodoxies” (Perry 1996 [1948]: 204). Politically, James was much more liberal than Peirce. On the whole, Peirce and James certainly were two of the most unorthodox thinkers of their time who did not exhibit a pronounced tendency to conform to traditional doctrines and knowledge. In the case of Peirce, his social and scientific non-conformity even destroyed all his hopes of a university career (cf. Thayer 1981: 70f.; Menand 2001: 272ff.).

Agassiz's lectures and classes, it seems, played an important role in inducing his students to take an evolutionary perspective.

Prodded at first by Agassiz's encouragement to study the Darwin question – in order to help show, as one student reported, “what is right and what is wrong in our pure and beloved science” – zoology students at Harvard soon began debating Darwinism. About 1862 Alpheus Hyatt, an invertebrate paleontologist, became the first of Agassiz's students to embrace the new theory. (Numbers 1998: 32; see also Fisch 1947: 358)

Hence, different factors can be identified that made the acceptance of an evolutionary framework by the generation of the early pragmatists more likely. However, in most cases, this acceptance did not mean that Darwin's theory was recognized as the most convincing. That James took such a strong Darwinian stance and made Darwin's work the starting point of his psychology, therefore, is remarkable. The same holds true for Peirce who designed an innovative cosmological theory that built upon Darwin's works in essential respects. But why did the pragmatists interpret Darwin's theory as an unprecedented opportunity rather than as a danger as many others?

The end of the “block universe”

By accepting the Darwinian doctrine, the pragmatists were confronted by the question of how a philosophy could be developed that would deal with the challenges of evolutionary theory in a convincing way. For the first two generations of pragmatist thinkers, the obvious candidate to develop such a philosophy was Herbert Spencer. More than any other thinker of his time, Spencer tried to systematically uncover the implications of evolutionary theory with respect to the entire spectrum of contemporary knowledge – from philosophy and psychology to sociology, ethics, and political theory. Even more than in his native England, Spencer's work had an enormous intellectual influence in the United States (cf. Hofstadter 1955: 31ff.; Francis 2007: 8). Of course, Spencer did also influence the pragmatists. However, his influence was mainly a negative one, and Spencer became pragmatism's primary “whipping boy” (Fisch 1947: 364) for decades. This criticism of Spencer provides important insights into the pragmatist understanding of evolution.

Spencer, in the eyes of the pragmatists, was the first thinker to recognize that the notion of evolution left no intellectual sphere untouched. However, he interpreted evolution differently from Darwin and, hence, presented a characterization of it that was erroneous, at least from a pragmatist perspective. Not only did Spencer describe the evolutionary process as teleological but he also tried to integrate it into a closed and axiomatic philosophical system, which, from a pragmatist standpoint, ran counter to the very idea of evolution. From a pragmatist point of view, Spencer's work could be characterized as a philosophy of evolution that did not allow for the evolution of philosophy. Because of his deterministic and universalistic outlook, the pragmatists did not consider Spencer to be a genuinely evolutionary thinker. For example, according to Dewey, Spencer's system can be interpreted as a translation of 18th-century ideas into the language of the 19th century. Physical and astronomical laws, faith in nature, and theories of social progress were reformulated using biological and evolutionary vocabulary (cf. Dewey 2008 [1904]: 200ff.). Thus, despite its evolutionary terminology, Spencer's philosophy appeared to be a new form of the "quest for certainty". Spencer, in short, did not leave the "block universe" (James 1909: 310).

For the pragmatists, Spencer's work appeared as the conclusion of an intellectual development, while Darwin's work represented a scientific breakthrough that opened up new intellectual paths. In the historical narratives of the pragmatists, the Darwinian revolution does not appear to be an abrupt breach but the culmination of a whole series of scientific and mathematical innovations that took place in the 19th century. Peirce, for example, described the years before the publication of Darwin's *On the Origin of Species* as "the most productive period of equal length in the entire history of science from its beginnings until now" (Peirce 1992 [1893]: 358). Thereby, Peirce referred to

the great strides made through the use of observational and statistical, experimental and mathematical methods in physical, biological, and social sciences after 1845, resulting in the discovery of fundamental theories: the conservation of energy, the kinetic theory of gases, the second law of thermodynamics, the evolution of the earth's crust and the fossils found therein, the stages of embryological development, the principles of domestic breeding, Quetelet's, Comte's, and Buckle's sociological generalizations, Tylor's laws of the development of primitive societies, Maine's theory of the passage from status to contract, and

the Malthusian law of population growth (which Darwin said suggested to him the idea of the struggle for survival). (Wiener 1972 [1949]: 8)

The developments described by Peirce were not only of decisive importance in forming Darwin's line of thought but also paved the way for the later acceptance of his claims (cf. Mayr 1982: 379ff., 477ff.). In contrast to Spencer, these innovations did not promote a mechanical interpretation of nature. Instead, from a pragmatist point of view, they made such an interpretation impossible. In the light of these developments any object appeared as a snapshot of an open process of change, revealing the radical historicity, processuality, and contingency of history. At the same time, however, historicity, processuality, and contingency were not considered to render processes of change unintelligible. Rather, their scientific interpretation was understood as a new challenge which could be met, for example, by replacing deterministic with probabilistic or model-based explanations (cf. e.g., Peirce 1992 [1877]: 111; Dewey 1929: 197f.).¹⁷

Because scientific innovations render philosophical reconstructions necessary from a pragmatist perspective, the Darwinian revolution must also change the character of philosophy significantly (cf. Dewey 2004 [1920]: 43f.). In contrast to astronomy, physics, or chemistry, which dominated scientific discourses in the 17th and 18th centuries, Darwin precipitated a systematic break with the "predisposition of philosophy towards the universal, invariant, and eternal" (Dewey 1929: 20). Accordingly, Mead argues that philosophy must follow the lead of evolutionary theory in taking the processuality of reality as its starting-point (cf. Mead 1936a: 164). As a consequence, many traditional philosophical questions appear in a different light or disappear completely. According to Dewey, the Darwinian

¹⁷ The difference between Darwin's and Spencer's views on natural history could be explicated in more detail with respect to their respective conceptualizations of the basic mechanisms of evolution. On the one hand, Spencer argued for a direct effect of the environment on the organism, the inheritance of acquired characteristics, and a continuous increase in complexity in the course of evolution. Thus, his theory was similar to Lamarck's (for Spencer's view on evolutionary change, see Richards 1987: 422ff., Francis 2007: 191f., and Pearce 2010: 243). On the other hand, Darwin's conception of natural selection posited the interplay of variation and selection, which, in contrast to Spencer's theory, involved an irreducible element of chance. In the eyes of the pragmatists, therefore, Darwin's theory was the only one that can account for the emergence of novelty. From a pragmatist perspective, Spencer's evolutionary theory was limited to a deductive teleology, while Darwin's model implied a kind of evolutionary abduction. This is why, from a pragmatist perspective, only Darwin's theory can be regarded as being genuinely evolutionary (cf. James 2014 [1880]: 221f.; Dewey 2008 [1904]: 208f.).

revolution led to an insight into the voidness of long-standing questions that held the sciences captive for thousands of years (e.g., purpose vs. chance, mind vs. matter). Only after Darwin did it become possible to ask new, more relevant questions. “Doubtless the greatest dissolvent in contemporary thought of old questions, the greatest precipitant of new methods, new intentions, new problems, is the one effected by the scientific revolution that found its climax in the *Origin of Species*.” (Dewey 1998 [1909]: 45)

It now becomes clear that, for the pragmatists, Darwin’s theory was much more than an important biological innovation. As the “climax” of a broad scientific revolution, it marked the beginning of a fundamentally new way of thinking. Hence, Darwin’s approach, which started out as an explanation of the emergence of new species, became a kind of ‘intellectual crowbar’ that made it possible to step out of a rigid and timeless “block universe” and into an open and changeable “pluralistic universe” instead, which – although inherently unpredictable – could be subjected to intelligent control and rational reconstruction. Thus, the Darwinian revolution transformed the understanding of natural history, the development of the natural sciences, and the prospects and limits of philosophy.

Evolution, psychology, and human agency

In the wake of the Darwinian revolution, not only the anatomy and physiology of organisms but also their psychical faculties appeared in a new light. Just as bodily characteristics, psychological competencies now had to be understood as functional adaptations (i.e., as products of evolution that enabled the organism to cope with the challenges posed by their environment). As early as 1859, Darwin claimed that his theory would place psychology on “a new foundation” (Darwin 1998 [1859]: 367). With the publications of *The Descent of Man, and Selection in Relation to Sex* and *The Expression of Emotions in Man and Animals* in the early 1870s, this claim was explicitly expanded to the mental faculties of man. Hence, it became increasingly clear that the theory of evolution would alter the understanding not only of the bodily features but also of the activities and minds of human beings.

Darwin's mind in a German body

In order to understand psychological capacities as evolutionary products, they had to be linked to concrete physical processes, to a kind of material basis that could be altered by natural selection. For such an understanding of the mind, Darwin only provided a theoretical framework. What was missing, however, was the knowledge of how the mental processes were implemented in the body. This is why the rapid advances in anatomy and physiology, which paralleled the debate on the theory of evolution, became immensely important – especially in the German-speaking world (cf. Farr 1996: 17ff.). The rapid strides taken in anatomy and physiology initiated a materialization of the mind which turned psychological processes into things that were tangible and could be manipulated.

These developments were also of great importance in terms of the history of American psychology. Among the approximately 10,000 American students who came to Germany between 1865 and 1914 to complete their studies were the pioneers of American experimental psychology. Wilhelm Wundt, in particular, influenced a large number of American students. Some of these later became founding figures in the field of American psychology and institutionalized the first psychological research laboratories based on the Leipzig model (cf. Ben-David and Collins 1966: 456ff.; Farr 1996: 18, 35f.).

One of these students was William James, who studied in Dresden and Berlin for 18 months, starting in the spring of 1867. In a letter to Thomas Ward, which was sent from Berlin in November 1867, James wrote:

It seems to me that perhaps the time has come for psychology to begin to be a science – some measurements have already been made in the region lying between the physical changes in the nerves and the appearance of consciousness ... (in the shape of sense perceptions), and more may come of it. (James cited in Stern 1965: 176)

In these lines, one can sense the euphoria that was triggered by the advances in physiological psychology (cf. Perry 1996 [1948]: 81ff., 106ff.). This euphoria suffused James for many years and ultimately led him to become one of the founders of American psychology. James summarized the results of his research in his groundbreaking work *The Principles of Psychology*, which was published in 1890 after years of work (and with a ten-year delay) (cf. Perry 1996 [1948]: 186ff.).

In the same vein, in an article published in 1884, the 25-year old John Dewey wrote that “the rise of this physiological psychology has produced a revolution in psychology” (Dewey 2008 [1884]: 53). During his graduate studies at Johns Hopkins University, greatly influenced by G. Stanley Hall, Dewey acquired an in-depth expertise in psychology over a short period of time (cf. Coughlan 1975: 48f.). In the years to follow, he strove to combine these insights with his early beliefs in neo-Hegelianism (cf. Westbrook 1991: 23ff.; Kloppenborg 1986: 42ff.).

A similar goal was pursued by the young George Herbert Mead. During his three-year research stay in Germany, he delved into the current research in physiological psychology and decided to specialize in this area.¹⁸ Mead’s close friend Henry Castle, who was with Mead in Leipzig at this time, wrote to his parents in February 1889:

George thinks he must make a specialty of this branch, because in America, where poor, bated, unhappy Christianity, trembling for its life, claps the gag into the mouth of Free Thought, [...] he thinks it would be hard for him to get a chance to utter any ultimate philosophical opinions savoring of independence. In Physiological Psychology, on the other hand, he has a harmless territory in which he can work quietly without drawing down upon himself the anathema and excommunication of all-potent Evangelicalism. (Henry Castle cited in Cook 1993: 21)

These lines did not primarily describe Mead’s enthusiasm about a promising field of research but emphasized his hope that he could escape the theological constrictions of American philosophy.¹⁹ Following Hans Joas, one can say that Mead used physiological psychology as a “consciously chosen means to disguise philosophically rebellious ideas” (Joas 1985 [1980]: 17). Moreover, like other members of his generation, Mead hoped to find a new and more open-minded intellectual home within the emerging field of psychology (cf. Ben-David and Collins 1966: 465; Coughlan 1975: 123f.).

¹⁸ In Leipzig, Mead attended lectures held by Wundt, which were in philosophy, however, and not in psychology. In 1889, Mead enrolled at the University of Berlin, where he attended lectures held by Ebbinghaus and Dilthey. He started to write a doctoral thesis under the supervision of Dilthey but this was never completed. For Mead’s stay in Germany, see Joas (1985 [1980]: 18ff.), Cook (1993: 20ff.), Huebner (2014: 42ff.), and Pearce (2016).

¹⁹ The feeling that American philosophy was theologically constricted – especially at the Colleges – was an important negative factor in the formation of both Dewey’s and Mead’s thoughts (cf. Dewey 1998a [1930]: 14f.; Mead 1930: 216ff.; 1936b: 65ff.).

During the course of the institutionalization of psychology as an independent discipline, traditional psychological perspectives which focused on conscious processes and introspection increasingly became perceived as unscientific. At the same time, more and more members of the field argued for an empirical and experimental foundation for psychology. This position can also be identified in the work of James, Dewey, and Mead who, by drawing on Darwin and physiological psychology, developed a functionalist form of psychology. Hence, Edwin Boring's well-known claim, which was formulated in 1929, could also be applied to the pragmatists: "By 1900 the characteristics of American Psychology were well defined. It inherited its physical body from German experimentalism, but it got its mind from Darwin." (Boring cited in Campbell 1995: 32) However, this should not obliterate the fact that the insights of Darwin's theory as well as of physiological psychology were interpreted in vastly different ways. Therefore, we need to examine in what respects the functional approach to psychology, which was developed by the pragmatists, differs from other psychological theories of the time.

Living automata?

One possible interpretation of the implications of evolutionary biology and physiological psychology can be found in the "automaton theory", prominently put forth by the famous British biologist Thomas Henry Huxley (also known as 'Darwin's bulldog'). In his essay "On the Hypothesis that Animals are Automata, and Its History," published in 1874, Huxley uses the development of physiological research since Descartes as the starting point of his argument. From Huxley's perspective, the fact that the neurophysiological structures and processes in humans and in other vertebrates are essentially the same implies that consciousness cannot be a human-specific feature (cf. Huxley 1898 [1874]: 239). Accordingly, Huxley broke up the human monopoly of consciousness granted by Descartes and ascribed consciousness to all vertebrates. However, in doing so, Huxley argued that we are forced to admit that all vertebrates – including humans – are living automata. Huxley described consciousness as simply the by-product of a physiological process, within which consciousness itself plays no causal role. This claim found expression in Huxley's metaphor of the "steam whistle" (Huxley 1898 [1874]: 240). The steam whistle is activated by the activity of the train's engine, but its activation does not

affect the locomotive's mode of operation. Thereby, Huxley formulated an important early variant of the theory of epiphenomenalism, which – according to the principle of evolutionary continuity – applies to both non-human and human animals: “It seems to me that in men, as in brutes, there is no proof that any state of consciousness is the cause of change in the motion of the matter of the organism.” (Huxley 1898 [1874]: 243f.)

The pragmatists, and especially James, protested vehemently against such an account of human psychology. As early as 1878, James asserted the evolutionary function and causal efficacy of the mind (cf. James 1988 [1878]). Over the following years, he presented this thesis in more detail. James denied that reflexive and affective processes were “a mere collateral product of our nervous processes, unable to react upon them any more than a shadow reacts on the steps of the traveler whom it accompanies.” (James 1879: 1) If this were really the case, James argued, it would be inexplicable why they were produced by natural selection. Therefore, a certain advantage had to be connected with reflexive and conscious processes (cf. esp. James 1950a [1890]: 138ff.). For James, this advantage consisted in the possibility of highly developed animals to react to the contingencies of their unstable and changing environments in a flexible and intelligent way. The weakening of instinctive control, increase in the inhibition and uncertainty of behavior, and development of more complex and energy-consuming neural processes turned out to be effective and successful evolutionary strategies only against this background. “We may thus lay it down as an established fact that the most perfected parts of the brain are those whose actions are least determinate. It is this very vagueness which constitutes their advantage.” (James 1879: 5) Consciousness, therefore, does not serve a ‘meditative’ purpose originally. Rather, it is an evolutionarily advantageous, highly functional, and effective “*fighter for ends*” (James 1950a [1890]: 141).

The “fighter” is not always present but comes to the fore only in specific situations. Conscious action-planning begins when a situation is unclear, and the habitual patterns of behaviors break down (cf. James 1950a [1890]: 142). In such situations, consciousness becomes functional. Its emergence makes an alternative, non-habitual regulation of behavior and the development of a new plan of action

possible. Therefore, James felt that to deny any efficacy to consciousness would be impossible. By developing this argument, James believed that he had found a way to reconcile the findings of evolutionary biology, physiology, and psychology with the conviction that something like autonomy and moral agency existed.²⁰

James criticized Huxley, the staunch Darwinist, by applying Darwinian evolutionary theory to psychology – thereby creating a new kind of functionalist psychology. The functionalist approach adheres to Darwinian gradualism and the principle of continuity (cf. James 1950a [1890]: 130) but it rejects the automaton theory. Consciousness is conceived as having a crucial function within the practical interactions with the environment.²¹ This is why it only occurs in specific situations. Thus, functionalist psychology does not interpret consciousness as a mere epiphenomenon. However, neither is it conceptualized as the ‘standard mode’ of experience. This marks a crucial difference between pragmatism and traditional conceptualizations of consciousness, which held on to introspective methods.²² The pragmatist ‘naturalization’ of mind, thus, rejects both extremes – the elimination and the absolutization of consciousness.

Pragmatism emerged in a time which, to speak with Charles Taylor, witnessed the constitution of the “secular option”.²³ Religion was now no longer conceived as self-evident. Instead, it became necessary not only to decide which denomination one wanted to belong to but also to answer the question of whether or not one believed in God at all. In the wake of the Darwinian revolution, the choice between

²⁰ James also developed a similar argument with regard to the functional and causal roles of emotions for human agency (cf. James 1879: 17f.; 1950a [1890]: 143f.). For objections to James’s criticism of the automaton theory, see Myers (1986: 207ff.).

²¹ This focus on the relational interplay between organism and environment is crucial for the pragmatist conception of action. It can be traced back to the influence of Spencer (cf. Pearce 2010). Despite his relentless criticism of Spencer, James underlined the originality of Spencer’s concept of “organism-environment-interaction” (cf. James 1911 [1904]: 139).

²² The difference between the functionalist and introspective approaches in psychology could be exemplified by looking at the functionalist criticism of Edward Bradford Titchener’s structuralist psychology, which also arose around the turn of the century (cf. e.g., Titchener 1899; Angell 1903).

²³ By means of his concept of the “secular option,” Taylor proposes a definition of the term “secular” that focusses on the “conditions of faith”: “The shift to secularity in this sense consists, among other things, of a move from a society where belief in God is unchallenged and indeed, unproblematic, to one in which it is understood to be one option among others, and frequently not the easiest to embrace.” (Taylor 2007: 3) Taylor dates the constitution of a fully-formed “secular option” in the United States to the end of the 19th century. The natural sciences were of special importance for this constitution and particularly the Darwinian revolution (cf. Taylor 2007: 28, 322ff.).

agnosticism and faith was increasingly regarded as identical to the choice between science and religion. James's criticism of Huxley must be seen within this context. Theories such as Darwin's or Huxley's raised the fundamental question of whether the human species, which was formed by the process of evolution and which functions according to biological laws, could be regarded as an autonomous and, hence, morally-responsible individual. Because they doubted whether this question could be answered in the affirmative, authors such as James and Mead fell into long periods of severe depression.²⁴ Therefore, when discussing evolutionary or physiological insights, much more was at stake than philosophical or psychological problems. Rather, these insights were related to deeply personal issues because they challenged religious and moral beliefs that were of vital importance.²⁵ Because it presents a naturalist account of the possibility of autonomy, moral agency, and the plurality of experience, functionalist psychology can be interpreted as an attempt to avoid the (seeming) dilemma between science and religion.²⁶ Obviously,

²⁴ On James' deep biographical crisis, see especially Perry (1996 [1948]: 119ff., 208ff., 359ff.) and Richards (1987: 412ff.). James himself claimed that the philosophy of Charles Renouvier showed him the way out of his predicament. In the end, however, Darwin's theory first and foremost provided him with the intellectual means to transform Renouvier's ideas into a systematic argument. For Mead's inner conflict between science and religion, which preoccupied his mind from his college years onwards, see Joas (1985 [1980]: 15ff.), Cook (1993: 7ff., 21f.), and Pearce (2016).

²⁵ The four classical pragmatists all belonged to deeply religious, Protestant families. This was already documented for Peirce and James in the first section of the paper (footnote 16). Dewey's education was characterized by the "emotional Congregational pietism" of his mother Lucina Rich Dewey (Westbrook 1991: 3; see also Coughlan 1975: 3ff., Kloppenberg 1986: 42f.). During his studies and also during his time in Michigan, Dewey led a Bible study group and was active as a lay preacher. It was not until the mid-1890s that he gave up on his faith (cf. Westbrook 1991: 22ff., 79). Mead grew up in a family that had "long roots in New England Puritanism and passionate commitment to Christian values" (Shalin 2011: 374). His father, Hiram Mead, was a minister of a congregational church and, later, a professor of homiletics (i.e., the history and theory of preaching) at Oberlin College in Ohio. Mead's mother especially hoped that George would follow in his father's footsteps and become a minister (cf. Joas 1985 [1980]: 15; Shalin 2011: 374f.).

²⁶ Of course, the argument just presented is sketchy and should be elaborated in more detail. While I argue that the deeply religious Protestant background of the pragmatists significantly contributed to their positive, yet non-biologistic and anti-epiphenomenalist interpretations of Darwin's theory of evolution, I do not claim that there is a necessary connection between Protestantism, anti-reductionism, and pragmatism. Otherwise, it would be inexplicable how Dewey and Mead could refine their pragmatist theories over the courses of their lives while they distanced themselves from their Christian beliefs, or how non-Protestant thinkers could contribute to the development of pragmatism. Also, it is important to see that none of the pragmatists defended a specific kind of religious teaching. Rather, when speaking about religion, they focused on questions of moral agency and the possibility of religious experience in general. "Our faculties of belief were not primarily given us to make orthodoxies and heresies withal; they were given us to live by." (James 2014 [1895]: 56)

then, the interpretation of scientific insights is interlaced with the general cultural and biographical contexts.

The ordinary man as the protagonist of pragmatist theory

So far, it has become clear that pragmatism does not conceptualize man as a biological automaton whose consciousness, feelings, and experiences are nothing but ‘organic waste heat.’ Nor does it conceive of man as a kind of ‘ever conscious philosopher’ who is detached from the concrete problem situations. Instead, the pragmatists choose the “ordinary man” (Dewey 2004[1920]: 3) as the ‘protagonist’ of the pragmatist theory of action. By focusing on the “ordinary experience of the common man” (Dewey 1998b [1930]: 205), the pragmatists stress the importance of the bodily, affective, and practical dimensions of human life and emphasize that action is always entangled in environmental interaction. Hence, by referring to the ordinary man, the pragmatists not only adopt a concept that is deeply rooted in American cultural history,²⁷ but also choose a specific theoretical perspective.

The pragmatist reference to the ordinary man should not be misinterpreted as a kind of philosophical populism or intellectual elitism. Neither does the concept aim to glorify the ‘simple’ and ‘down-to-earth,’ and degrade the ‘idle talk of the intellectuals’; nor does it imply the elitist contempt for the ‘common man.’ Instead of strengthening these distinctions, the reference to the ordinary man is intended

²⁷ In his seminal study *Sources of the Self*, Charles Taylor describes the “affirmation of ordinary life” as a general tendency of the monotheistic world-religions, which became radicalized in Protestantism (cf. esp. Taylor 1989: 218ff.; see also Reinhard 2005). In the wake of this cultural change it is no longer the heroic deeds of honorable men or the detached contemplation of monks and nuns that are regarded as moral ideals, but “the life of production and reproduction, of work and the family” (Taylor 1989: 23). This reevaluation of ordinary life was especially clear in the Puritan forms of Protestantism, which became particularly effective in the American colonies. The affirmation of ordinary life induced a broad cultural change, which also encompassed literature, the fine arts, and philosophy (cf. Jung, 2014: 7ff.). It can be identified, for example, in the transcendentalism of Emerson and Thoreau, which – with its emphasis on the ordinary and its nonconformist criticism of institutions – also influenced the pragmatists (cf. e.g., James 2013 [1903]; Dewey 1998 [1903]; Mead 1930: 217; 1936b: 65). Of course, the concept of the ordinary man can be linked to another historical process, which is also of fundamental importance for the self-understanding of the United States: the frontier narrative. Already in 1896, the historian Frederick Jackson Turner emphasized this connection between the settlement of the West and the “exaltation of the common man” (Turner 1921 [1896]: 214). Later, Turner’s account of the importance of the frontier in American history was reinterpreted by the pragmatists, who criticized the pessimistic, evolutionist, and ruralist character of Turner’s interpretation (cf. Dewey 2008 [1930]: 129ff., 2008 [1939]: 225; Mead 1936b: 64). For the relationship between the religious reevaluation of ordinary life and the frontier narrative, see e.g., Mills (1966: 373f.).

to undermine the dualisms between the physical and the spiritual, the practical and the theoretical, the habitual and the reflexive, and the simple and the complex. In this sense, all men are ordinary. According to the pragmatic principle of continuity,²⁸ ordinary experience has to be understood as a predominantly bodily, emotional, and a largely pre-reflective or even unconscious process that is oriented towards the fulfillment of certain wishes and hopes in practical action (cf. e.g., Dewey 2004 [1920]: 3f.). ‘Higher’ mental processes are not to be considered as detachable from this primary form of experience. What is more, from a pragmatist perspective, conscious and speculative thinking must be understood as being functionally dependent on bodily, habitual, and affective processes.

The concept of the ordinary man is used by the pragmatists as a corrective to the intellectualism of philosophy and the continuous danger of the “psychologist’s fallacy”.²⁹ The concept creates awareness for the specific and partial character of reflexive – and especially scientific – experience and, hence, helps to do justice to the varieties of experience.³⁰ The functionalist reconstruction of scientific experience does not, however, lead to a degradation of science or philosophy. Instead, the reciprocal dynamics are highlighted. The pragmatists not only claim that scientific thought is functionally dependent on ordinary experience but also emphasize the potential for the rational reconstruction of ordinary experience through the workings of rational scientific discourse (cf. Jung 2014: 3ff., 25).³¹ In pragmatism, science, therefore, does not aim at the elimination of subjectivity as an explanatory variable. Nor does it constrict experience to one specific mode. Rather,

²⁸ According to Dewey, “the idea of continuity is not self-explanatory. But its meaning excludes complete rupture on one side and mere repetition of identities on the other; it precludes reduction of the ‘higher’ to the ‘lower’ just as it precludes complete breaks and gaps.” (Dewey 1986 [1938]: 30)

²⁹ “The *great* snare of the psychologist is the *confusion of his own standpoint with that of the mental fact* about which he is making his report. I shall hereafter call this the psychologist’s fallacy *par excellence*.” (James 1950a [1890]: 196)

³⁰ According to Mead, the warning against the reduction of experiential plurality to scientific knowledge constitutes an essential motive of Dewey’s philosophy (cf. Mead 1936b: 74f.). Indeed, this motive can be found in both early and later texts by Dewey (cf. e.g., Dewey 2008 [1884]: 59; 1998b [1930]: 196).

³¹ The importance of ordinary experience as a foundation of all activity and as an inevitable philosophical starting point is most consequentially formulated in the work of Dewey – especially in the first chapter of *Experience and Nature* (Dewey 1958 [1925/29]), in *The Quest for Certainty* (Dewey 1929), and in his conception of “common sense” in his *Logic* (cf. Dewey 1986 [1938]: 66ff.). This motive can also be found in the works of the other classical pragmatists (cf. e.g., Jung 2014).

it strives for an understanding of the evolution of the plurality of experience up to the point of self-consciousness and the realization of the evolutionary process itself. The pragmatists identify the conditions for this increasing reflexivity of experience in the specificities of human sociality. This brings us to the next level of pragmatist evolutionary thought.

Evolution, sociality, and historical openness

After the American Civil War, the United States underwent a process of profound social change. This was especially obvious in the urban areas such as Chicago, which became an emblem for radical social transformation. Between 1870 and 1930, the city's population exploded from around 300,000 to 3.4 million people, leading to a great deal of unplanned urban development. The ethnic and extreme economic differences became reflected in the city's structure. Different ethnic neighborhoods developed, and only a few kilometers separated the suburbs of the new middle class, the slums of the poor, and the neighborhoods of the wealthy. These disparities led to social friction and eventually severe and violent conflicts. In short: It was an "era of urban chaos" (Pacyga 2011: 69).

These transformative processes stimulated scientific reflection, and it seemed evident to many social scientists that these problems had to be interpreted within the framework of evolutionary theory, which dominated the intellectual debates. Hence, evolutionary theory became the foundation of a variety of sociological and political perspectives; social Darwinism turned out to be especially important. For many, social Darwinism even appeared to be the consequential 'translation' of Darwin's thought into the social sciences (cf. Francis 2007: 189).

The openness of evolution and the evolution of openness

In the eyes of Spencer and other social Darwinists, the disruptions and pathologies resulting from social change constituted a kind of necessary suffering. They represented the price that needed to be paid for evolutionary progress. Accordingly, the task of sociology was limited to understanding the laws of social evolution. Every effort to ease the disruptions constituted an intervention in the inevitable course of evolution and was considered, thus, to expose the naiveté and ignorance of the reform-minded approaches (cf. Hofstadter 1955: 43). Hence, social

Darwinism characterized the natural process itself as rational. Social hardships needed to be accepted because they made progress possible.

Social Darwinism was not alone in connecting social change with a teleological conception of evolution. Important representatives of early American sociology, such as Lester Ward and Edward Ross, who were part of the progressivist reform movement, also identified an evolutionary development towards progress (cf. Degler 1991: 13ff.). In contrast, the classical pragmatists did not conceptualize evolution as a teleological process that leads towards a final and morally desirable outcome. Instead, from a pragmatist perspective, Darwin's theory revealed the irreducible contingency of history. Unlike Spencer, the pragmatists considered this contingency to be the condition that allowed for the possibility of the intelligent reconstruction of society. Unlike the progressivists, the pragmatists emphasized the fragile, fallible, and temporary character of social reconstruction. Therefore, with reference to the relationship between evolution and social change, the pragmatists did not only disagree with social Darwinism but also with its progressive opponents – although there is, of course, they agree with the latter with respect to important political and reformist objectives.

The differences do not end here, however. According to pragmatism, both Spencer and the progressivists misconstrued evolution in yet another way, because they did not distinguish between the different levels of evolutionary change. As they equated natural evolution with social progress, they arrived at biologicistic and basically genetic definition of progress. This is why many progressive thinkers, despite their criticism of social Darwinism, associate social progress with 'genetic improvement.' Depending on which evolutionary mechanism was considered to be plausible, this led to two different reform strategies. Those progressive thinkers who followed a Lamarckist theory of evolution, like the early sociologist Lester Ward, called for the improvement of the social environment. According to this 'Lamarckist progressivism,' changes in the environment would automatically bring about favorable genetic changes, thus, leading to the socially-desirable abilities and behavior of the individuals (cf. Hofstadter 1955: 67ff.; Degler 1991: 21f.).

After Weismann's refutation of Lamarckist evolutionary theory in the late 1880s, an increasing number of progressive social scientists subscribed to an alternative,

Darwinist argument instead. Because they not only connected biological evolution with social progress but also rejected the heritability of acquired characteristics, they considered that there was only one other way to improve the biological make-up of the population: the direct shaping of the gene pool. For this reason, many advocates of progressivism in the United States as well as in Europe not only supported eugenic or racist theories but also accepted their political consequences (cf. Geiss 1988: 176ff.; Degler 1991: 16ff.).

In contrast, the classical pragmatists did not consider the question of how the development of society affects the genetic make-up of human beings (and vice versa) to be significant because they connected cultural change with evolutionary processes in a fundamentally different way.³² Evolution, from a pragmatist point of view, is an open-ended process that, over time, has produced two qualitatively new forms of openness.

Three levels of openness

“Chicago”, John Dewey wrote in a letter to his wife Alice in 1894, “is the place to make you appreciate at every turn the absolute opportunity which chaos affords – it is sheer Matter with no standards at all.” The city appeared to him as “hell turned loose, and yet not hell any longer, but simply material for a new creation” (Dewey cited in Westbrook 1991: 83f.). As these quotations show, the pragmatists retained their confidence in the rational reconstruction of their social environment even in the face of “urban hell.” This perspective differs markedly from that of Spencer and the Progressivists. It can be understood only against the background of the pragmatist conceptualization of evolution, which distinguishes between three levels of change.

The first level is that of biological evolution. As I argued in in the first section of the paper, the pragmatists understood natural history (according to the Darwinian paradigm) as an open-ended and contingent process that – by means of natural

³² With the exception of Peirce, the pragmatists can be regarded as critical of eugenic and racist arguments. Although Peirce was critical of social Darwinism (cf. e.g., Peirce 1992 [1893]: 357), his general outlook was in many respects staunchly conservative. For example, he defended slavery all his life – just as his father, Benjamin Peirce, had (cf. Brent 1998: 34, 64; Menand 2001: 161). Overall, however, the pragmatists did not hold homogenous, unambiguous, or explicit positions with regard to these questions. “All in all, American pragmatism has tended to evade race rather than address it.” (Sullivan 2011: 183) Especially Cornel West drew attention to this fact.

selection – brings about genuinely new life-forms. This basic biological idea, in turn, facilitated a fundamentally new understanding of all historical processes. The second level of openness is that of individual action. As shown in the second section, the pragmatists insist that individual experience and agency must not be ‘swept’ under the ‘evolutionary carpet.’ According to the pragmatists, individual agency and creativity are not refuted by evolutionary theory. Instead, within the framework of functional psychology, consciousness and reflexivity are presented as effective evolutionary adaptations that fulfill essential functions in human conduct. However, the question of the emergence of these adaptations has not yet been addressed. The question, therefore, is how and why, over the course of evolution, the experience of organisms changed in such a way that it did not remain in a pre-reflective mode but became increasingly reflexive and finally self-reflective.

From a pragmatist perspective, the genesis of human self-reflexivity results from crucial changes in the way that the interactions among organisms and environment are organized. According to this view, the behavior of ‘lower organisms’ is guided by instinct and does not depend on learning or reflection. In contrast, “the human being differs from the lower animals in precisely the fact that his native activities lack the complex ready-made organization of the animals’ original abilities” (Dewey 2002 [1922], S. 107). Instead of being guided purely by instinct, human behavior is based on learning, habits, and self-reflection. While James and Dewey regarded self-reflexivity as a direct result of the increasing reduction of instincts over the course of human evolution, Mead argued that the question of the reduction of instincts and emergence of self-reflexivity need to be connected to the evolution of new forms of *social* interaction and communication.³³ Self-reflexivity, Mead argued, depends on the capability to look at oneself through the eyes of another person (or group), that is, on the ability of perspective-taking. The ability to take a perspective, in turn, developed over the course of social evolution because it allowed for a new form of group coordination that was no longer purely based on instinct but also on habitual and symbolic interactions. Because humans can view themselves from another perspective, they can examine their own activities objectively and coordinate their actions with those of others in a reflexive way. According to Mead,

³³ This explains why Mead was so interested in the contemporary debate on social instincts that also started with Darwin (cf. Mead 1908).

the ability of perspective-taking improves over the course of ontogeny. Particularly by acquiring language, humans internalize the specific perspectives, practices, and knowledge of their group. At the same time, each individual becomes a medium for the transmission of these cultural artefacts, thereby allowing for the third level of openness – cumulative cultural history.³⁴

According to the pragmatists' "cultural naturalism" (Dewey 1986 [1938]: 28), biological evolution has led to the emergence of a qualitatively new level of historical change that follows its own logic. Compared to biological evolution, this mode of historical change operates on a completely different time scale, which is why an unprecedented degree of innovation is possible. Unlike other animals, humans are able to "rehearse" their actions; that is, they can control their future activity by imagining, reflecting, and evaluating its "anticipated consequences (forecasts)" (Dewey 1986 [1938]: 63, 113).³⁵ Thus, on the third level of openness, ideas mostly 'die,' rather than organisms. Moreover, in contrast to genetic innovations, the 'surviving', successful, or favorable ideas can be 'passed on' directly. Hence, one could say that the process of Darwinian evolution gave rise to new – cultural – mode of historical change that, to a certain degree, follows Lamarckist principles since it allows for the 'inheritance of acquired competencies and knowledge.' However, unlike Lamarckism, the environment is not alone in inducing change because humans can adapt their environment to meet their own needs in a variety of ways. Thus, to use an example of Mead's (1936a: 365), humans no longer have to "wait" through long periods until they evolve a stomach that can break up the cellulose covering of grains. Instead, humans can construct a mill that grinds the grain 'for the stomach.'

³⁴ I can only present a very rough outline of the crucial arguments of Mead's social theory. The foundations of Mead's social psychology have been developed in the series of articles that were published between 1909 and 1913 (for a detailed interpretation of these contributions, see Joas 1985 [1980]: Ch. 5). Arguably the most condensed and systematic presentation of Mead's argumentation can be found in his article "The Genesis of Self and Social Control" (Mead 1925). The most accessible account can be found in Mead's most popular book *Mind, Self, and Society* (Mead 1967 [1934]). However, *Mind, Self, and Society* was compiled from different lecture notes and editorial additions. Therefore, from both an editorial and philological point of view, it remains a highly problematic volume (cf. esp. Huebner 2014: Ch. 5). For a brief summary of some of the main arguments of pragmatist social theory, see Nungesser and Wöhrle (2013).

³⁵ In Dewey's later writings, the ability to "forecast" the consequences of future actions is perceived as the hallmark of intelligence. In earlier texts, however, he advocated a more gradualist understanding of intelligence. For the development of Dewey's conception of intelligence and its relation to the contemporary debate, see Camic (2011).

The interaction with the physical environment is not the only thing that has changed fundamentally. In addition, the emergence and widening of the ability of perspective-taking makes it possible for individuals to arrive at a “nonpersonal, objective power of intelligence” (Dewey 1894: 208). Mead captures this widening of perspective by means of his well-known concept of the “generalized other” (cf. esp. Mead 1967 [1934]: 152ff.). By taking the perspective of the “generalized other”, whereby individuals are capable of distancing themselves from their own perspective. They can systematically integrate the perspective of other individuals as well as the collective into the course of their own activities. This is a crucial step that leads to the emergence of morality and politics in the widest sense. So, once again, it becomes clear that the pragmatist reading of Darwin does not lead to amoral biologism. Rather, the pragmatists try to formulate a socio-anthropological theory of moral agency and social self-reflectiveness that identifies the conditions of possibility of scientific objectivity, self-criticism, and social reform. In a way, the psychological and socio-anthropological arguments allow the pragmatists to conceptualize their own thoughts and actions by pragmatist means. Accordingly, their commitment to social reform can be seen as an attempt to use human-specific forms of environmental control to deal with new environmental challenges by taking diverse and generalized forms of perspectives into account.³⁶

Against this background, it is easier to understand why the pragmatists did not interpret Darwin’s insight into the radical contingency of history as a profound threat to morality and rationality. Despite the fact that they understood the historicity of seemingly timeless certainties, truths, and values, they did not succumb to what Richard Bernstein calls the “Cartesian anxiety,” that is, “the fear or apprehension that if there are no such basic constraints, no foundations, no determinate ‘rules of the game’, then we are confronted with intellectual and moral chaos where everything goes” (Bernstein 1986: 344). For pragmatists, the fact that it seemed impossible to base philosophy on solid epistemic ground did neither lead to moral relativism nor to the call for the institutional fixation of the “unfixed

³⁶ For Dewey and Mead in particular, social reform was not only a theoretical problem but also a practical task. During their lifetimes, they were involved in various social reform projects, particularly on the municipal level. For details on Dewey’s political thought and his work in social reform, see esp. Westbrook (1991). For Mead, see Joas (1985 [1980]: 21ff.) and Shalin (1988).

animal” or to the flight into an irrational and fascist “philosophy of action”.³⁷ From a pragmatist standpoint, history does not become irrational because of its contingency (cf. Dewey 1929: 202ff.). Rather, the possibility of rationality results from the evolution of experience. That it was the result of a contingent process does not mean that rationality is in any way less necessary or important. By acknowledging this fact, pragmatism, according to Karl-Otto Apel, became one of the few philosophies (besides Marxism and Existentialism) that

have taken up as a topic of thought the great problem of humanity thrust into an unfinished world, the mediation of theory and praxis with regard to an uncertain future. Each in its own way has recognized that in a world that is not a finished cosmos, in a life that, as Kierkegaard says, “must be lived in terms of the future,” and in a social situation that can be changed, philosophy cannot be self-contained. (Apel 1995 [1975]: 1)

Consequently, the pragmatists considered contingency not as a wellspring of fear but as a condition and resource of social change and rational reconstruction.

Just like social and political reflexivity, science can be understood as the result of a cultural history of experience and reflection. Mead considered science to represent the highest form of reflexivity because with the development of science, the cultural evolution of human experience had reached a point at which it could become aware of its own origins: “What I wish to point out is that the scientific method, as such, is, after all, only the evolutionary process grown self-conscious.” (Mead 1936a: 364) Thus, at this point, the circle of the pragmatist argument is completed: The third (i.e., the sociocultural) level of historical openness leads to an understanding of its own genesis on the first (i.e., biological) level of change.

The preceding discussion shows that the Darwinian revolution shaped pragmatist thought on all levels. The pragmatist notion of cosmic and historical change was as profoundly influenced by evolutionary theory as the understanding of human and animal physiology or the conception of individual experience and agency. Darwin’s doctrine fundamentally influenced pragmatist social and political theory and challenged pragmatists’ confidence in their moral and religious beliefs. Finally, Darwin’s arguments encouraged them to revise their conceptions of the possibilities

³⁷ This is why classical pragmatism needs to be distinguished from the work of authors such as Giovanni Papini, Georges Sorel, or Arnold Gehlen who were influenced by pragmatism and developed different kinds of anti-democratic or fascist arguments (cf. Vogt 2002).

and limits of philosophy and science. This evolutionary analysis, however, did not lead to a 'theoretical clumping.' In other words: By giving a fundamental role to the process of evolution within their conceptual framework, the pragmatists did not perceive evolution as a macroactor, which affected all areas of life in the same way. Rather, by advancing a sort of "transdisciplinary non-reductionism", which combined insights from the humanities as well as the social and natural sciences, the pragmatists strove to achieve an understanding of the evolutionary emergence of social, cultural, and individual processes that followed their own logic.

Moreover, the discussion illustrates that the context in which pragmatism emerged was highly transnational, transdisciplinary, and conflict-ridden. Within this context, the pragmatists repeatedly made fundamental decisions that ran counter to the scientific, cultural, or political mainstream ideas of the time: The pragmatists supported Darwin very early on, opposed social Darwinism, rejected eugenics and fought for the radical-democratic reconstruction of society. Hence, the discussion proves how misguided interpretations that characterized pragmatism as the consequential philosophical result of an opportunistic, superficial, and money-grubbing American culture were.³⁸ In contrast to such clichéd interpretations, it must be emphasized that the historical context of pragmatism was far from homogenous. Also, it must be noted that the social context of theoretical innovations does not determine the intellectual outcome. Of course, that does not mean that the context is extraneous to intellectual development. Like any other theory, pragmatism itself can be considered from a pragmatist point of view, that is, as a conceptual struggle with the challenges, problems, and innovations of the time. Like any such struggle, the pragmatists had to build on the scientific knowledge and cultural interpretations available in their environment. Nevertheless, the theoretical conclusions drawn by the pragmatists remain innovative and creative achievements. Consequently, instead of being 'determining' or 'irrelevant,' the

³⁸ Dewey had already struggled against these interpretations (cf. e.g., Dewey 1998 [1922]). For the history of these misinterpretations, which were especially common in the German-speaking world, see Joas (1993 [1992]: Ch. 2–4).

scientific and cultural contexts allowed them to make an intellectual reconstruction of a specific historical experience.³⁹

The ongoing evolution of pragmatism

The history of violence and oppression over the past centuries has been inextricably linked to social Darwinist, racist, and eugenic ideas. Understandably, this has led to widespread skepticism towards biological research in the social sciences. In a way, this skepticism can be seen as an inversion of “the rapidly increasing prestige” that has been attributed to the natural sciences since the beginnings of industrialization and made them a kind of “modern ersatz religion” (Geiss 1988: 171; my translation). Moreover, disciplinary rivalries and boundary further reduce the chances for a renewed interdisciplinary exchange. If a genuinely transdisciplinary dialogue is to be reestablished, it seems reasonable to go back to theoretical approaches that advocated a positive attitude towards the life sciences, but which had already rejected biologicistic and now-discredited theories at the height of their popularity. Accordingly, pragmatism appears to be such a promising theoretical framework.

The classical pragmatists sought to establish a productive yet critical dialogue with the natural sciences. However, the development of pragmatism did not live up to this transdisciplinary claim for a long time. Not even after the beginning of the pragmatist “renaissance”⁴⁰ in the late 1970s was this shortcoming addressed promptly (cf. Baldwin 1986: 154f.; Franks 2010: 1f., 2013, 139f.; Solymosi 2013: 93).⁴¹ It is only in recent years that the momentum to renew the dialogue has increased. In the last section of the paper, I will illustrate that researchers from diverse fields such as psychology, the cognitive sciences, neurophysiology, and ethology are not only showing a marked interest in pragmatism but may also be

³⁹ For the pragmatist interpretation of theoretical reflection as critical re-adaptation to a given historical situation, see Dewey (1998 [1925]: 4, 11f.).

⁴⁰ See, for example, Bernstein (1992) and Dickstein (1998).

⁴¹ Already the pragmatists bemoaned and criticized the growing isolation of academic disciplines – both with respect to the relationship between philosophy and the social sciences and between the humanities, social, and cultural sciences on the one hand and the natural sciences on the other hand (cf. e.g., Dewey 2008 [1929]: 161).

making contributions that can be used to substantiate and update some of pragmatism's key arguments.

Cognitive processes as functional and embodied phases of action

Studies in the psychology of perception, the cognitive sciences, and neurophysiology can be used to refine the pragmatist claim that psychological processes such as perception, attention, memory, or reflection can be understood as functional as well as embodied phases of action. For example, the functional character of cognition can be demonstrated by referring to the current research on perception. Studies in this area show that the enormous selectivity of perception can only be understood if we dismiss the "copy theory" (Mead 1936a: 344) of perception and knowledge, which dominated philosophy and psychology for centuries (cf. Loenhoff 2001, 77ff.; Noë 2006, 35ff.). Experimental research on perception illustrates that we only perceive a very limited part of our environment. This applies not only to elements in the environment that are not relevant for our current activity ("inattentional blindness") but also to prominent, yet currently irrelevant changes in the objects of our focus ("change blindness") (cf. e.g., Simons and Levin 1998; Simons 2000; Mack 2003). These experimental findings can be more clearly explained by conceptualizing perception not as a 'mirror' or 'photograph' of reality but as an actively constituted stimulus that enables the organism to cope with its current activity and situation. This was already emphasized in James's psychology: "My experience is what I agree to attend to. Only those items which I notice shape my mind – without selective interest, experience is an utter chaos." (James 1950[1890]: 402)

On a more general level, the pragmatists, thus, reject a psychological account that characterizes organisms as passive 'receivers' of sense data and conceptualizes the processing of this data according to a one-way model, which describes the transfer of information from the perceptual periphery to the cognitive center and, finally, to the locomotor system. The pragmatist criticism of such a "dualism of peripheral and central structures and functions" (Dewey 1896: 357) converges with current studies on the embodiment and situated nature of cognition.⁴² Instead of subscribing to the

⁴² For different perspectives on this convergence, see Gallagher (2009, 36ff.), Johnson (2007, 2010), Jung (2009, 2011); Fingerhut et al. (2013, 32ff.), and Madzia (2013).

dualistic “sandwich” model of cognition (cf. Hurley 1998: 401ff.), both pragmatists and researchers that use embodied and situated approaches in cognitive science prefer to use a model in which perceptual, cognitive, and motor processes modify each other in a circular way.

Moreover, several scientific developments corroborate the pragmatist claim that our access to the environment is structured according to our bodily actions. This is to say that objects in our environment “invite” us directly to take certain actions (Mead 1964 [1938]: 12). Here, again, the pragmatists anticipate arguments that are currently being discussed within the cognitive sciences. Often, these studies do not mention pragmatists when discussing the embodied and action-oriented character of perception but refer to J. J. Gibson’s ecological approach in psychology (cf. Shapiro 2011: Ch. 2). According to Gibson, the elements of perception are neither visual raw data nor isolated objects in a geometrically-constructed space. Instead, we perceive “affordances”: “The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill.” (Gibson 2011 [1979]: 127) These arguments can also be combined with important insights in the neurosciences. For example, neurophysiological research into so-called “canonical neurons” suggests that neuromotor processes do not coordinate movements but actions. Accordingly, similarities among patterns of neural excitation depend on the similarities among the objectives (e.g., grasping with the hand or grasping with the mouth), not on similar movements (e.g., gripping by hand or holding by hand) (cf. Gallese 2000: 30, Rizzolatti and Sinigaglia 2008: Ch. 2). Against this background, it is not surprising that Rizzolatti and Sinigaglia (2008: 34ff.) not only draw on Gibson’s theory of affordances but also refer to Mead’s argument on the importance of the body and especially the hand for perception. For example, in his article “The Nature of Aesthetic Experience”, Mead writes: “Man lives in a world of Meaning. What he sees and hears means what he will or might handle. The proximate goal of all perception is what we can get our hands upon.” (Mead 1926: 382) Rizzolatti and Sinigaglia update Mead’s argument by showing that

the analysis of visuo-motor transformations [...] indicates that the seeing that guides the hand is also (and above all) seeing with the hand, by which the object is immediately coded as a given set of invitations to act. [...] In other words, these

neurons appear to respond to the meaning the stimulus conveys to the individual, rather than its sensory aspect (Rizzolatti and Sinigaglia 2008: 61).

Recent research in psychology, the cognitive sciences, and neurophysiology can be used to confirm and update pragmatists' claims with regard to the process of perception and, perhaps, even cognitive processes in general. This research shows that perception can indeed be interpreted, first, as functional and, therefore, selective process, second, as being an active part of the bodily and cognitive interactions of the organism with its environment, and, third, as being constitutively structured by the patterns of bodily activities. However, not only the pragmatist account of the relationship between perception, action, and the body but also pragmatist social theory can be substantiated by drawing on recent empirical findings.

The evolutionary continuity of human sociality

If the pragmatist account of the evolution of human sociality is scrutinized in light of current empirical research, an important problem is revealed. Despite their emphatic advocacy of Darwin's theory, the pragmatists are unable to transform the general principle of evolutionary continuity into a detailed and gradualist account of the genesis of the human life form. Dewey, for example, repeatedly emphasizes the continuous increase in behavioral inhibition, physical manipulation, or reflexivity over the course of evolution (cf. e.g., Dewey 1986 [1938]: 30ff.; 1958 [1925/29]: 252ff.). However, when it comes to the description of specific differences between non-human animals and humans with regard to communication, group organization, or social learning, Dewey (just as Mead) falls back on the ideal-typical and dichotomous opposition of 'man' and 'animal' that was (and is) typical for the vast majority of positions in philosophy and the social sciences.⁴³ At least in part, this important shortcoming can be traced back to the methodological pre-assumptions and methods of contemporary (animal) psychology as well as to the lack of systematic and detailed ethological knowledge.⁴⁴ Because of this interconnection between the empirical state of knowledge and the development of

⁴³ Mead's rather dichotomous distinction between humans and animals has been criticized repeatedly in the field of *Human-Animal-Studies* (cf. e.g., Alger and Alger 1997; Myers 2003; Irvine 2003).

⁴⁴ On the development of comparative psychology and the dominance of "anti-anthropomorphism" after Darwin, see e.g., Degler (1991: 329ff.).

theoretical concepts, it seems consequential to review pragmatist key claims against the background of current research findings. Three of these key claims will now be reviewed.

Within the pragmatist account of the genesis of human-specific sociality, the *evolution of communication* plays a crucial role. In this respect, Mead develops the most detailed arguments. In different texts, he distinguishes between an instinct-regulated mode of gestural communication that he considers to be typical of non-human animals⁴⁵ and uniquely human communication that is characterized as flexible, symbolic, and potentially self-reflective.⁴⁶ Findings from current research on animal communication also emphasize the crucial importance of gestural interactions for the genesis of human-specific group coordination, self-reflexivity, and language. However, especially as primatological studies show, flexible, learned, and reflexive communication not only emerged with the genus *homo*. Rather, different primate species are able to adapt their communicative behavior according to the situation. For example, communicating individuals intentionally move into the perceptual field of conspecifics or inhibit typical gestures, so that others see (or do not see) their gestures (cf. Corballis 2003; Tomasello 2008: Ch. 2, 5). Findings from primatological research also suggest that the first forms of human-specific communication emerged from sophisticated forms of manual communication, which can also be found in recent ape species. Although these findings fit well with the pragmatist emphasis on the crucial role of the hand in human evolution, they run counter to Mead's well-known claim that human language developed out of what he calls (following Wundt) "vocal gestures" ("*Lautgebärden*") (cf. Nungesser 2016, Ofner 2016).

The fact that some non-human primates can flexibly adapt their communicative behavior to the social situation already suggests that not only the ability to communicate in a reflexive way but also to *take the perspective* of others can no longer be regarded – as in Dewey and Mead – as a human monopoly. In particular in competitive experimental designs, apes, but also other species such as dogs (cf.

⁴⁵ The most prominent example of animal communication in Mead's work is his account of the dog fight (cf. Mead 1910b: 177f.; 1925: 263; 1967 [1934]: 14f., 42-45, 48f., 63, 68, 162, 181, 234).

⁴⁶ A similar distinction between animal and human communication can be found in Dewey (1958[1925/29]: 176f.).

Kaminski et al. 2013), clearly display their abilities to take on the perspective of other individuals, at least with respect to their perceptions and goals. For instance, in various experiments, chimpanzees adapt their behavior so that their respective rivals do not see or hear them. They do so in a flexible and spontaneous way (cf. Hare et al. 2006; Kaminski et al. 2008). However, other experiments have demonstrated that the abilities of apes to take the perspective of others are restricted in important ways. For example, they do not seem to be able to understand communicative intentions. This could be demonstrated through pointing experiments. Although the apes could follow the direction indicated by pointing the index-finger at the correct object (a box containing food), they did not use this information but chose an object at random (cf. e.g., Tomasello 2006).⁴⁷ Consequently, it seems as though the pragmatist concept of perspective-taking is too monolithic. It should be differentiated to allow for different forms and degrees of perspective-taking – from simple forms of anticipation to full-fledged role-taking. Moreover, both the development of communication and of perspective-taking suggests a gradual evolutionary increase in inhibition and behavioral flexibility. Therefore, pragmatism needs to reconceptualize the evolution of the second level of openness (i.e., self-reflexive agency) according to the principle of evolutionary continuity.

Finally, the pragmatist account of the evolution of human-specific sociality needs to be revised with respect to *social learning*. The classical pragmatists, especially Mead, excluded the possibility that non-human animals can learn through imitation (cf. e.g., Mead 1967 [1934]: 51), because no observations to the contrary had (yet) been made. Thus, they seem to have inferred that, in general, no important processes of social learning exist among non-human animals – even though Mead himself implicitly mentioned alternative social learning processes in some passages (cf. Mead 1980 [1922]: 160; 1967 [1934]: 52f.). Hence, again, the pragmatists posited a deep gulf between the genetically-regulated and, in some cases, conditioned behavior of animals and the activities of human beings, which are considered to be structured by complex processes of social learning and cultural history. Yet, if one examines the findings of current ethological studies, diverse

⁴⁷ In contrast, other species such as dogs, domesticated foxes, or jackdaws seem to understand pointing (see e.g., Hare and Woods 2013).

forms of social learning have been reported for non-human animals. First of all, processes of “local enhancement” and “stimulus enhancement” have commonly been observed in animal populations (cf. e.g., Maynard Smith and Szathmáry 1999: 137ff.). These forms of learning result from the simple fact that many animals belong to social groups. Through their involvement in group activities, they come into contact with places and objects which are crucial for their survival. Thus, the individual learns because its attention is “canalized” (Boesch and Tomasello 1998: 599) in a particular direction by the group. In addition, some species expand their behavioral repertoire by “emulation learning”, during which the animals learn by observing how other group members make use of the objects in their environment – by using stones as tools, for example.⁴⁸ In the case of emulation learning, the animal’s focus is placed on the consequences that other individuals generate by their activity in the environment. In contrast, in the case of “imitation learning,” the focus also is placed on the way these effects are generated, that is, on the relation between means and ends (cf. Tomasello 2004: 52). Whereas several species learn by means of emulation, whether or not non-human species are capable of imitation is still controversial. In any case, non-human animals seem to use imitation much less frequently than humans (cf. e.g., Tomasello 2009: 215ff.; Boesch 2012: 37f.). As the distinction between different forms of social learning shows, the social transfer of knowledge can be based on a much wider range of different processes than the classical pragmatists thought. Against this background, it becomes possible to give a much more detailed and less dichotomous account of the emergence of the third level of openness: from simple forms of stimulus enhancement and group learning to the protocultures of some animal species to the historical and cumulative cultures of humans (cf. e.g., Tennie et al. 2009; Boesch 2012).

With respect to the renewed transdisciplinary discussion on pragmatism, the historical reconstruction of pragmatist evolutionary thought provided in this paper is instructive for at least two reasons. First, the historical perspective illustrates the scope and diversity of pragmatism. Against this backdrop, it becomes clear that

⁴⁸ Although tool use has by now been observed in various species and is regarded today as one of the most important areas of social learning in non-human animals (cf. e.g., Sanz et al. 2013), both Mead and Dewey denied that animals used tools (cf. e.g., Dewey 1958 [1925/29]: 185f.; Mead 1906).

various contributions to the recent debate do not make use of the full potential of pragmatism. For example, some studies that focus on problems of social theory have focused almost exclusively on Dewey but marginalized other relevant contributions such as Mead's.⁴⁹ Second, the historical reconstruction of the transdisciplinary nature of pragmatism can serve as a bulwark against disciplinary reductionisms, which are creeping back, for example, into some neuroscientific appropriations of pragmatism (cf. Goldman 2012: 20). Only if the historical breadth and potential of pragmatism are combined with the findings of current research will the evolution of pragmatism give rise to further innovations.

Acknowledgements

I would like to thank Hans Joas, Stephan Moebius, Thomas Tripold, and the editors of the *European Journal of Sociology* for helpful comments and critical remarks. Also, I thank Sara Crockett for proofreading the manuscript.

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⁴⁹ See, for example, Johnson (2010: 128), Schulkin (2009: 6ff., 23ff.), Solymosi and Shook (2013: 218f., 222f.).

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