AI as (Profound) Art

Selmer Bringsjord

Rensselaer AI & Reasoning (RAIR) Lab
Department of Cognitive Science
Department of Computer Science
Lally School of Management & Technology
Rensselaer Polytechnic Institute (RPI)
Troy, New York 12180 USA

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RPI 12/3/2015
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AI as (Profound) Art
AI as (Profound) Art ??
AI as (Profound) Art

Yes, the title is amphibolous.
Al as (Profound) Art

Yes, the title is amphibolous.

Is it? …
Al as (Profound) Art ??

Yes, the title is amphibolous.

Is it? …

“Als (ie intelligent, artificial agents) as Objects of (Profound) Art”
Al as (Profound) Art

Yes, the title is amphibolous.

Is it? …

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Or is it? …
Al as (Profound) Art ??

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<tr>
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The table lists various terms related to art, including Dabbling, Mimetic Art, NEaF Artifacts, “Art of” Art, and Profound Art.
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“Als (ie intelligent, artificial agents) are (Profound) Artists”

No, Als themselves can’t be true artists. They can at most mimic truly intelligent, creative humans.
AI Themselves as Would-Be Artists: AARON
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Ray Kurzweil and Harold Cohen view AARON's artwork in Harold's Studio

From the film The Age of Intelligent Machines
AI Themselves as Would-Be Artists: AARON

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Kurzweil CyberArt Technologies
We create software that creates art.
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Brutus. I
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Whatever success Dave and I might have achieved, due in no small part to engineering Brutus. I to mimic Eco’s reader-response approach.
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Whatever success Dave and I might have achieved, due in no small part to engineering Brutus. I to mimic Eco’s reader-response approach.
E.g.,
E.g.,

1887

Tosca

1900

@"old Met"

1914
E.g.,

1887

1900

1914

2015

Tosca

@ “old Met”

“I lived for art!”

@ “new Met”
E.g.,

Tosca @ “old Met”

“I lived for art!”
@ “new Met”

1887 1900 1914 2015
A reader-response trick so simple even a Norwegian can understand it and use it (Bernt Brandhaug & Rakel):
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![Image of books]
“Computer Programming as an Art”

“We have seen that computer programming is an art, because it applies accumulated knowledge to the world, because it requires skill and ingenuity, and especially because it produces objects of beauty. A programmer who subconsciously views himself as an artist will enjoy what he does and will do it better.”
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Specifically?

The cognitive scientists have answered this question! In short, specifically those powers that, in systematic and exact human-level thought, are utterly beyond non-human animals.
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For the Details ...
Darwin’s mistake: Explaining the discontinuity between human and nonhuman minds

Derek C. Penn
Department of Psychology, University of California—Los Angeles, Los Angeles, CA 90095, Cognitive Evolution Group, University of Louisiana, Lafayette, LA 70504
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http://www.cognitivediscovgroup.org/

Keith J. Holyoak
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Daniel J. Povinelli
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cogevolution.lsu.edu
http://www.cognitivediscovgroup.org/

Abstract: Over the last quarter century, the dominant tendency in comparative cognitive psychology has been to emphasize the similarities between human and nonhuman minds and to deprecate the differences as “one of degree and not of kind” (Darwin 1871). In the present target article, we argue that Darwin was mistaken: the profound biological discontinuity between human and nonhuman animals makes an equally profound discontinuity between human and nonhuman minds. To wit, there is a significant discontinuity in the degree to which human and nonhuman animals are able to approximate the higher-order, systematic, relational capabilities of a physical symbol system (PSS). We show that this symbolic-relational discontinuity pervades nearly every domain of cognition and runs much deeper than even the spectacles scaffolding provided by language or culture alone can explain. We propose a representational-level specification of to what degree human and nonhuman animal abilities to approximate a PSS are similar and where they differ. We conclude by suggesting that recent symbolic-constructivist models of cognition shed new light on the mechanisms that underlie the gap between human and nonhuman minds.

Keywords: analogical; animal cognition; cultural learning; communication; Darwin; discontinuity; evolution; human mind; language; language of thought; physical symbol systems; reasoning; same-different; theory of mind

1. Introduction

Human animals— and no other—build fires and wheels, devise each other’s illnesses, communicate using symbols, navigate with maps, seek their lives for ideals, collaborate with each other, explain the world in terms of hypothetical causes, punish strangers for breaking rules, imagine impossible scenarios, and teach each other how to do all of the above. At first blush, it might appear obvious that human minds are qualitatively different from those of every other animal on the planet. Ever since Darwin, however, the dominant tendency in comparative cognitive psychology has been to emphasize the continuity between human and nonhuman minds and to downplay the differences as “one of degree and not of kind” (Darwin 1871). Particularly in the last quarter century, many prominent comparative researchers have claimed that the traditional hallmarks of human cognition—for example, complex tool use, grammatically structured language, causal-logical reasoning, mental state attribution, metacognition, analogical inference, mental time travel, culture, and so on— are not really as unique as we once thought (see, e.g., Bekoff et al. 2002; Call 2000; Clutton et al. 2003; de Waal & Packer 2000; Matsuoka 2001; Pepperberg 2002; Rendell & Whitehead 2001; Savage-Rumbaugh et al. 1999; Smith et al. 2003; Tomasello et al. 2005). However, for over 35 years, researchers have been documenting through tests both in the field and in the laboratory that the capacities of nonhuman animals to solve difficult problems form a continuum with those of human animals.
Darwin’s mistake: Explaining the discontinuity between human and nonhuman minds

Derek C. Penn
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dcpen@mcgill.ca
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Keywords: analog; animal cognition; causal learning; consciousness; Darwin; discontinuity; evolution; human mind; language; language of thought; physical symbol system; reasoning; same-different; theory of mind

1. Introduction

Human animals—and no other—build fires and wheels, diagnose each other’s illnesses, communicate using symbols, navigate with maps, think their way through ideas, collaborate with each other, explain the world in terms of hypothetical causes, punish strangers for breaking rules, imagine impossible scenarios, and teach each other how to do all of the above. At first blush, it might appear obvious that human minds are qualitatively different from those of every other animal on the planet. Ever since Darwin, however, the dominant tendency in comparative cognitive psychology has been to emphasize the continuity between human and nonhuman minds and to downplay the differences as “one of degree and not of kind” (Darwin 1871). Particularly in the last quarter century, many prominent comparative researchers have claimed that the traditional ballistics of human cognition—for example, complex tool use, grammatically structured language, causal-logical reasoning, factual state attribution, metacognition, analogical inference, mental time travel, culture, and so on—are not vastly in unique as we once thought (see, e.g., Bekoff et al. 2002; Call 2000; Clifton et al. 2003; de Waal & Pika 2006; Matsuoka 2001; Pepperberg 2002; Rendell & Whitehead 2004; Savage-Rumbaugh et al. 2000, Smith et al. 2000; Tomasello et al. 2000). Pepperberg (2005, p. 496) aptly sums up the comparative consensus as follows: “For over 35 years, researchers have been demonstrating through tests both in the field and in the laboratory that the capacities of nonhuman animals to solve matching problems fall a continuum with those of humans.”

(defun our-length (lst)
  (if (null lst)
      0
      (+ (our-length (cdr lst)))))
For the Details ...

Quantification!

Recursion!

(defun our-length (lst)
  (if (null lst) 0

Darwin’s mistake: Explaining the discontinuity between human and nonhuman minds

Abstract: Over the last quarter century, the dominant tenets in comparative cognitive psychology have been to explain dissociation between human and nonhuman minds, and to disparage the differences in ‘the degree and not the kind’ (1957). In the present target article, we argue that Darwin was mistaken: the profound biological distance between humans and nonhuman species from which the human mind emerged uniquely produced the gap in the cognitive and neurocomputational abilities of chimpanzees and nonhuman primates. We show that: the somatic theory of mind, which posits that the human mind emerges from the somatic core of the language system, is not available to nonhuman primates; that the human mind is uniquely designed for language, and that language is a unique and essential feature of the human mind.

Keywords: language; animal cognition; neural structure; consciousness; Darwin; nonhuman primates; human; language; language of thought; phylogenetic theory; reasoning; cross-species theory; dual.

1. Introduction

Human animals and all other terrestrial vertebrates may be divided into two major groups: the primate group and the non-pri- mate group. The primate group includes all species of apes, monkeys, and humans, while the non-primate group includes all other terrestrial vertebrates. Within the primate group, the human species is unique in its capacity for language, and in its ability to think and reason about abstract concepts. This unique capacity is central to our understanding of the human mind.

More recent comparative cognitive psychology research has challenged the traditional dualistic view of human cognition — for example, the view that humans have a grammatical structure language, and that this structure is not available to nonhuman primates. Recent research has shown that nonhuman primates have the cognitive abilities to understand and use language, and that they are capable of learning and using language in a way that is similar to humans. This suggests that the human mind is not unique, but rather that it is a development of the nonhuman primate mind.

On Lisp

Advanced Techniques for Common Lisp

Paul Graham
Shortcut: Karkooking Problem ...
Shortcut: Karkooking Problem ...

Everyone karkooks anyone who karkooks someone.

Alvin karkooks Bill.

Can you prove that everyone karkooks Bill?

ANSWER:

PROOF:
Shortcut: Karkooking Problem …

Everyone karkooks anyone who karkooks someone.

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Can you prove that everyone karkooks Bill?

ANSWER:

PROOF:
Shortcut: Karkooking Problem …

Everyone karkooks anyone who karkooks someone.

Alvin karkooks Bill.

Can you prove that everyone karkooks Bill?

ANSWER: Yes!

PROOF:
Shortcut: Karkooking Problem …

Everyone karkooks anyone who karkooks someone.

Alvin karkooks Bill.

Can you prove that everyone karkooks Bill?

ANSWER: Yes!

PROOF: A recursive one!
Shortcut: Karkooking Problem …

Everyone karkooks anyone who karkooks

Alvin karkooks

Can you prove that everyone larks

ANSWER

PROOF

Quantification!

Recursion!
<table>
<thead>
<tr>
<th>Dabbling</th>
<th>Mimetic Art</th>
<th>NEaF Artifacts</th>
<th>“Art of” Art</th>
<th>Profound Art</th>
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Mimetic Art

NEaF Artifacts

“Art of” Art

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| Dabbling | Mimetic Art | NEaF Artifacts | “Art of” Art | Profound Art |
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Profound Art
Profound Art
Profound Art
Profound Art
Mimetic Art

Dabbling

NEaF Artifacts

Profound Art

Classics

Mozart
(Don Giovanni)
Mimetic Art

Dabbling

NEaF Artifacts

Profound Art

Classics

Mozart

(Don Giovanni)
Mimetic Art

Dabbling

NEaF Artifacts

Profound Art

Classics

Mozart

(Don Giovanni)

May 7 1788: Conductor: M!
Profound Art

Classics

Mozart
(\textit{Don Giovanni})

May 7 1788: Conductor: M!
Profound Art

May 7 1788: Conductor: M!

Mozart
(Don Giovanni)
Profound Art

May 7 1788: Conductor: M!
Profound Art
Mimetic Art

"Art of" Art

Dabbling

NEaF Artifacts

Profound Art
Profound Art is marked by being eternally new!
Profound Art

is marked by being eternally new!

So how on the Goebelesque view is it that: “Alniks (ie AI Scientists & Engineers) are (Profound) Artists”? 
An opera may or may not be eternally new for you, but *robot persons* would be, and hence it’s happening before our eyes, but gradually: some AI scientists and engineers are moving up to the highest level!
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E.g., those @ Aldebaran
E.g., those @ Aldebaran
Slutten