Contemporary Concept Nativism: Some Methodological Remarks

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Review article

Abstract

The innate knowledge problem is a classical problem in philosophy, which has been known since the classical antiquity. Plato in his dialogues *Meno* and *Phaedo* formulated the doctrine of innate ideas and proposed an early version of the poverty of the stimulus argument, which is the most frequently used argument in innate knowledge debates. In the history of philosophy there was also an opposite view. This approach is often associated with J. Locke's philosophy. Locke thought that all our knowledge about the world is a product of the universal learning mechanisms whose functioning is based on perception. The question about the presence of innate ideas in the human mind still remains relevant. New findings in cognitive science and neurosciences and also some recent arguments from philosophers contribute to the contemporary discussion between the spokesmen of the rival approaches to this problem. The paper presents the investigation of one of the approaches to solving the problem of innate concepts, which is called a "concept nativism." It highlights the outstanding characteristics of the concept nativism: (a) domain specificity position, (b) belief that domain-specific mechanisms of learning are innate and (c) belief that at least some concepts are innate. The article also proposes an analysis of notions "innateness" and "idea" which is important for understanding nativists' approach to innate ideas theory. And finally, it describes the most popular nativists' arguments: (a) references to empirical studies using the preferential looking technique, (b) the poverty of the stimulus argument and (c) the argument from animals.

Keywords: ideas, innateness, nativism, domain specificity, poverty of the stimulus, modularity, empiricism.

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Современный нативизм идей: некоторые методологические замечания

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Аннотация

Проблема врожденного знания – классическая философская проблема, известная еще с античности. Платон в своих диалогах «Менон» и «Федон» сформулировал концепцию врожденных идей и предложил раннюю версию аргумента от бедности стимула – наиболее распространенного аргумента в спорах о врожденных идеях. Платон считал, что усвоение идей происходит не за счет процессов обучения, а является следствием припоминания уже имеющегося в нас знания. В истории философии существовала и противоположная точка зрения, известная нам, прежде всего, благодаря философии Дж. Локка. Локк считал, что абсолютно все наше знание о мире является продуктом универсальных механизмов обучения, работа которых обеспечивается перцептивными данными. Вопрос о существовании врожденных идей и сегодня не теряет актуальности. Новые данные из когнитивной науки и нейронаук, а также свежие аргументы философов, способствуют продолжению обстоятельной дискуссии между представителями конкурирующих подходов к данному вопросу. Статья посвящена исследованию одного из подходов к решению проблемы врожденных идей – современному нативизму идей. Отмечаются его характерные особенности: 1) концепция местной специализированности, 2) вера во врожденность местно-специализированных механизмов обучения и 3) вера в наличие как минимум нескольких врожденных идей. Также проводится анализ понятий «врожденность» и «идея», проясняющий смысл нативистского подхода к теории врожденных идей, и излагаются наиболее частые аргументы сторонников нативизма: 1) ссылки на эмпирические исследования, использующие метод зрительных предпочтений, 2) аргумент от бедности стимула и 3) аргумент от животных.

Ключевые слова: идея, врожденное, нативизм, местная специализированность, бедность стимула, модулярность, эмпиризм.

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Introduction

The innate knowledge problem is a classical problem in philosophy, which has been known since Plato's works. Plato in his dialogues *Meno* and *Phaedo* formulated the innate concepts doctrine and proposed an early version of the poverty of the stimulus argument, which is the most frequently used argument in innate knowledge debates nowadays. Nonetheless, the discussion around the question of innate concepts is more strongly associated with the works of modern era philosophers, such as Descartes, Locke, Hume or Leibniz.

From the Locke and Hume time and up to the middle of the 20th century empiricism was the dominant approach (at least in science). After that, the Chomsky's early works started the so-called "nativist turn," which resulted in the revival of those old debates about concepts, making it crucial for contemporary metaphysics.

As a result, nativism [Carey 2009; Chomsky 1965; Fodor 1983; Margolis & Laurence 2013] has become the most influential view in science and philosophy. Nevertheless, in recent days we can observe the resurrection of empiricism in the works of many scientists and philosophers [Barsalou 1999; Barsalou 2018; Clark 1993; Cowie 1999; Damasio 1989; Prinz 2002], criticizing the nativist approach. The new empiricism movement is often called "neo-empiricism."

But what was that convincing in the nativism of the 20th century, so it put the end to the long empiricist rule (at least until recent times)? I believe it is the union of the appealing theory and the sound arguments. In the first part of the article, I have described the crucial features of modern nativism. In the second part, I have clarified terms "concepts" and "innateness." In the third part, I have described the most popular nativists' arguments.

Contemporary theory

At first, one may think that modern concept nativism is about innate concepts (1) (or innate cognitive structures) (2). It is partially true due to historical nativism (Plato, Descartes). But most of the contemporary scientists and philosophers can agree that today concept nativism is something more than just a belief in the existence of innate concepts [Cowie 1999, 3–25; Laurence & Margolis 2015]. The reason why it

should be more, as it was noticed by nativism theorists Laurence and Margolis, is that modern empiricists may also assume the existence of some innate concepts [Laurence & Margolis 2015, 118]. Quine once noted that even a behaviorist "is knowingly and cheerfully up to his neck in innate mechanisms" [Quine 1969, 95–96].

Hence, there must be something else to differentiate concept empiricism and concept nativism from each other. And the best candidate for this role is domain specificity, which was offered in 20th century by contemporary nativists. So, the essential distinction between concept nativism and concept empiricism is the idea of domain specificity.

The domain specificity hypothesis can be called the most noticeable feature of modern nativism. It, on the one hand, differentiates the new concept nativism versions from the historical ones (e.g. Cartesian concept nativism) and, on the other hand, draws the tangible border between modern concept nativism and neo-empiricism. The empiricist approach assumes the universal learning mechanism as opposed to nativists' domain specificity [Prinz 2005]. Basically, the domain specificity hypothesis states that the human mind has the different learning and processing mechanisms for the different types of information (more about domain specificity in [Baer 2016; Cowie 1999; Gelman 200]). These mechanisms can also be called "modules," if we follow Fodor's terminology [Fodor 1983].

Domain specificity helps nativists to solve the poverty of stimulus problem, which was initially presented in modern science and philosophy by Noam Chomsky (3) [Chomsky 1986]. Chomsky's argues that the process of language acquisition is so effective that it cannot happen just through universal learning rules. Lacking of information about the sophisticated syntax rules simply would not allow a child to acquire his native language so fast if there were only universal rules. We can express the poverty of the stimulus problem this way.

In the process of development, the information of the type *T* in the amount *A* was acquired.

As a result, the rule *R* was formed.

The rule *R* allows its carrier to process the information of the type *T* promptly and efficiently.

However, it seems that the amount *A* of information is not enough to form the rule *R*.

Let us presume it was formed through the basic (not specialized) learning mechanisms and input systems.

How *R* was formed?

The domain specificity hypothesis, as nativists claim, let us solve this puzzle [Simpson et al. 2005, 6–7]. It explains why children acquire a certain set of rules (e.g., language grammar) so fast despite a lack of learning. According to nativist approach, specialized mechanisms and dedicated input systems are better suited for acquiring information of various types. The main assumption is that the certain specialized type of acquisition mechanism, which corresponds to a certain type of information, provides better learning in a shorter period of time than a mechanism governed by universal rules.

Nativists traditionally think that concepts can occur as a product of domain-specific learning mechanisms despite the lack (or absence) of learning. In other words, they accept the innate concepts hypothesis. Laurence and Margolis notice that innate concepts hypothesis is a crucial part of contemporary nativism [Laurence & Margolis 2015, 118].

We should also specify that these domain-specific mechanisms are innate in the most concept nativists' theories. That assertion allows us to distinguish nativism and certain forms of concept empiricism that claim that under certain conditions the domain specificity can emerge as a product of the universal learning mechanism [Karmiloff-Smith 1992].

As is clear from the above, the theoretical basis of modern nativism of ideas includes three inherent propositions.

1. The leading principle of the mind architecture is domain specificity.
2. Domain-specific mechanisms of the mind are innate.
3. At least some concepts derived from domain-specific modules are innate.

Concepts and innateness

It still remains unclear what exactly terms "concept" and "innate" mean. That is why we should clarify them to further examine contemporary nativism. Despite the fact that there are quite different views on the structure of concepts [Prinz 2002], we can say that some philosophers and cognitive scientists still have some basic conventional characterization of concepts. Today hardly anyone will challenge John Locke's definition of concepts as the "materials of reason and knowledge" [Locke 1823, 60] or reject the contemporary empiricist Jessy Prinz's characterization of concepts as "constituents of thoughts" [Prinz 2002, 2]. Many other researchers of this problem gave similar descriptions. For example, Susan Carey calls concepts "units of thought" [Carey 2009, 5], and K. Solomon, D. Medin and E. Lynch wrote that

concepts are "building blocks of thought" [Solomon, Medin, & Lynch 1999, 99], etc. (4).

The main advantage of this characterization is that it, on the one hand, refers to a concrete phenomenon and, on the other hand, leaves room for discussion [Prinz 2002, 2].

As for the term "innateness," on the contrary, there is heated debate around it. It is quite common and intuitive to put an equal sign between *innate* and *genetic*. However, this reasoning sometimes turns out to be counterproductive for innate concepts discussions. After all, the chain of amino acids (that is, proteins) is the only object with which it is possible to more or less correctly match genes. But comparing genes with concepts and other phenomena of mind encounters a number of methodological difficulties. As Peter Godfrey-Smith observes, genes do not describe but prescribe (with varying degrees of probability) whether a particular trait will appear or not [Godfrey-Smith 1999, 328]. Therefore, genes are incorrectly regarded as a blueprint of an individual's traits. Nonetheless, it is quite reasonable to present DNA as a set of causes leading to emergence of a certain traits. But, as we know, genes are not the only reason for the formation of a trait. For instance, to form secondary sexual characteristics, besides certain genes, an organism also has to get proper nutrition. Moreover, different traits can be formed under the influence of the same genes. For example, studies show [Pieau et al. 1994] that turtles *Emys orbicularis* "choose" their sex depending on the temperature at which the egg resides (for a review of similar examples see: [Gilbert 2003]). And vice versa, different genes can contribute to the formation of the same phenotype. In biology this phenomenon is called "genetic heterogeneity" [Matthew & Michael 2013].

Therefore, the assumption of the strict causal correspondence between gene(s) and trait seems too simplified, and referring to the corresponding group of genes seems to be insufficient reason to call a certain concept innate.

The lack of a unified definition of "innate" has given rise to many opinions about which features should be called innate. Some authors even argue that usage of the term "innate" is just a manifestation of naive biological essentialism. Hence, "innate" should be regarded as a term from folk biology [Griffiths 2002].

Despite the fact that there are many interpretations of "innate," concept nativists most often use the lack of learning approach as well as the ostensive approach to the definition of this term.

The lack of learning approach described by Khalidi [Khalidi 2002; Khalidi 2007] implies that we call a trait innate if that trait was formed despite the insufficient (poor) environmental impact required for the formation of this trait. In other words, according to the lack of learning approach, if a trait emerged despite the insufficient learning or a lack of learning, we assume it is innate. Innate traits with this approach are most often considered as evolutionary adaptations to the environment.

One of the most famous supporters of this approach is Noam Chomsky ("The speed and precision of vocabulary acquisition leaves no real alternative to the conclusion that the child somehow has the concepts available before experience with language" [Chomsky 1988, 28]). Another one is cognitive scientist Susan Carey ("As I use the term, innateness is interdefined with learning: innate representations are those that are not the output of learning processes" [Carey 2009, 11]).

Proponents of the ostensive approach believe it is enough to use the term "innate" if we simply pointed out where and when it takes place. The full description of "innate" will be elaborated in further investigations. T. Simpson, P. Carruthers, S. Laurence and S. Stich can be ranked: "Just as we can investigate the phenomena of locomotion, memory, chemical interaction, or planetary movement without fully explicit characterizations of the kinds involved, so too with innateness" [Simpson et al. 2005, 5].

Nativists' arguments

Since concept nativists make statements about the structure of cognitive reality, the most basic and obvious argumentation strategy for them is *to refer to empirical results from cognitive science*. Today this argumentation type is especially easy to use, since nowadays there are plenty of studies testing hypothesis of innateness of such concepts as *physical qualities of an object* (e.g. object continuity [Aguiar & Baillargeon 1999; Kellman & Spelke 1983; Spelke 1990; Spelke et al. 1995] or knowledge about the qualities of solid, soft and fluid objects [Rips & Hespos 2015]), *number and count* [Brannon 2002; Brannon, Abbott, & Lutz 2004; Dehaene 1990; Lipton & Spelke 2003; Lipton & Spelke 2004; McCrink & Wynn 2004; Wood & Spelke 2005; Xu & Spelke 2000; Xu & Spelke 2005], *agency* [Hamlin 2015; Saxe, Tenenbaum, & Carey 2005; Tomasello et al. 2005], *causality* [Cohen & Oakes 1993; Michotte 1963; Muentner & Carey 2010; Saxe & Carey 2006], *grammar* [Chomsky 1986;

Crain & Pietroski 2001; Crain & Thorton 1998; Pinker 1994], etc. [Margolis & Laurence 2013, 694]. The vast majority of these studies are based on the preferential looking method, which was suggested by Robert L. Fantz [Fantz 1958; Fantz 1961; Fantz 1963; Fantz 1964; Fantz, Ordy, & Udelf 1962]. In the series of experiments, Fantz demonstrated that in general children look longer at more heterogeneous surfaces or at objects with more complex patterns and look less at homogeneous surfaces or at objects with simple patterns. Researches usually combine this method with the habituation technique (5). In a later study, Fantz added habituation to a preferential looking experiment. This allowed him to identify a subject's visual preferences in cases where the time of observation of objects was initially the same due to the novelty of the objects.

Hunter and Ames later summarized these results and concluded that children (taking into account their age, IQ, etc.) after habituation tend to look longer at an object or a situation if it seems complex or unusual to them [Hunter & Ames 1988].

Thus, if situation after habituation seems unusual to a child, then it is not something he already knows. From that nativists conclude that some physical law or a logical operation occurring in the experimental situation is not innate. And vice versa, if a child seems to be familiar with the property/law/operation, then this property/law/operation is likely to be classified as innate.

Of course, the preferential looking method, like all scientific methods, has its limitations. For instance, we cannot know for sure why children stare longer at some situation or object. It may turn out that they find it generally more interesting (even after habituation) than the other ones and not because they think it is odder [Prinz 2005]. Reproducibility of some experiments is also very low. For the review of all limitations of the preferential looking technique see: [Munakata 2000].

Another nativists' argument is the *argument from the poverty of the stimulus*. It is undoubtedly the most popular argument among nativists. The structure of the poverty of the stimulus argument is such that we take the poverty of the stimulus problem discussed above and show that the best solution of this problem is domain specificity (i.e. modular structure of the mind). N. Chomsky proposed the most revealing versions of this argument in his famous paper criticizing the B. Skinner's theory of language acquisition [Chomsky 1959]. Chomsky's argument can be represented as follows.

1. There is a set of different possible grammars, which can be hypothesized by a child from the primary linguistic data (6).

2. There is no guarantee that the grammar learned by the child would be simpler and more natural than the possible alternatives.

3. Usually there is a lack of evidences that the grammar learned by the child is the one she should pick from the possible alternatives.

4. Hence, if children used universal learning principle (hypothesis testing), they would never acquire the correct grammar of their language.

5. The overwhelming majority of children do acquire the correct grammar of their language.

Conclusion:

6. Therefore, children do not use universal learning principles when they acquire language. And if so, a child's mind must be equipped with some specialized learning mechanism or principle helping him to acquire the correct grammar of the language (adapted from [Laurence & Margolis 2001, 22]).

As, we can see, the main reason of this argument is to show that the process of language acquisition is so effective because it cannot happen without some specialized inner machinery. This specialized inner machinery (or "language acquisition device" in Chomsky's terminology) hypothesis, as Chomsky suppose, is the best explanation of how we learn so sophisticated rules of grammar in so short period in our childhood with a lack of proper instructions and deficiency of negative evidences (parents usually do not correct their children's ungrammatical sentences frequently enough). Some later studies of linguistic universals came to the same conclusions [Crain & Pietroski 2001; Crain & Thorton 2000].

The third argument that nativists use is the *argument from animals*. The argument from animals is more basic. But it is usually combined with empirical evidence. The argument can be represented in the following form.

A. All animals are equipped with specialized learning mechanisms.

B. Human is an animal.

Conclusion:

C. Human is equipped with specialized learning mechanisms.

To strengthen (A), one appeals to the studies showing that different types of animals have different mechanisms for the formation of associations for different modalities, and that implies the domain-specific structure of their learning mechanisms [Margolis & Laurence 2013, 703–704]. Rats, for example, associate

food poisoning primarily with the taste of food and not with its color or smell. At the same time, rats being exposed to electricity associated this effect with visual and auditory stimuli [Garcia & Koelling 1966].

The first statement in this argumentation seems quite weak. And despite the fact that Laurence and Margolis in their paper gave lots of evidence, it is still perceived as doubtful. Mainly because there is a lack of studies dedicated to specialized learning mechanisms of non-human apes, which are much closer to us than rats or squirrels. Moreover, this argument only works if we assume in (A) that *all* animals have specialized learning mechanisms. It seems that such a strong assumption can hardly be supported by equally strong evidence.

Only the most universal and frequent arguments of the nativists were mentioned above. There are many other arguments. However, all of them are strongly tied to a theory of a particular researcher. That is why their presentation requires a description of these theories which goes far beyond the scope of the present work.

Conclusion

Thus, modern nativism can be defined as a hypothesis that our mind has many innate specialized learning mechanisms, the presence of which contributes to the formation of specific concepts. The concepts here are understood as "constituents of thought." Nativists usually say that a certain concept is innate if it was formed despite the lack of learning, or sometimes they simply define it ostensively.

In defense of their position, nativists most often use the following arguments: (a) references to empirical studies using the preferential looking technique, (b) the argument from the poverty of the stimulus and (c) the argument from animals.

The four leading versions of modern nativism of ideas are fertile ground for further research: linguistic nativism of Chomsky, Fodor's radical concept nativism, moderate nativism of Carey and syncretic nativism of Laurence and Margolis.

NOTES

(1) The terms "cognitive structure" and "concepts" can be used here interchangeably. Further I give the characterization that satisfies both terms.

(2) Historical nativism is sometimes called "rationalism." Nevertheless, there is a risk of confounding two different entities. The term "rationalism" is also used for the rationalist position in the modern era debates about

the justification of knowledge. Hence, I ignore this term to avoid any confusions.

(3) The very first mention of this problem was in Plato's dialogue *Meno*. That fact was highlighted by Chomsky when he called the poverty of the stimulus problem "Plato's problem" [Chomsky 1986, 7].

(4) Outstanding in this series is the concept eliminativism of E. Machery, who considers concepts as fruitless and meaningless term [Machery 2009].

(5) The habituation technique involves a preliminary demonstration of the object to the subject. This allows researchers to reduce the time of observation of the demonstrated object, that is, the level of its novelty for the subject.

(6) The term "primary language data" here means information about the grammar of the language received by the child in the learning process. Those who use argument from the poverty of the stimulus usually indicate that such information is not enough for the child to build the correct hypothesis about the grammar of a child's native language.

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