Propositional Attitudes from a Peircean Viewpoint*

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Abstract

Although Charles S. Peirce proposed a distinctive theory of the mind, it seems that the contemporary philosophy of mind pays insufficient attention to this theory. This article would like to propose a Peircean theory of propositional attitudes, aiming to provide a foundational scheme to reconsider Peirce's theory of the mind in the contemporary context. In the first section, Quine's insights into Peirce's pragmatism are reconsidered; these insights are useful to direct the discussion of this article. It is argued, however, that Quine's behaviouristic construal of Peirce's concept of belief needs to be amended. The second section generalises the Peircean theory of propositional attitudes. This theory adopts a functionalistic view instead of a behaviouristic view, and is a polyadic theory. The third section tries to find the right place for the Peircean theory in the contemporary field of the philosophy of mind. The Peircean theory is similar to Fodor's theory of propositional attitudes in several points. However, there can also be found a distinctive view of the Peircean theory: 'Peircean-habit semantics'. The fourth section clarifies this view. This article thus demonstrates the contemporary significance of Peirce's theory of the mind, particularly that of the Peircean theory of propositional attitudes.

Keywords: Charles Peirce, propositional attitudes, pragmatic maxim, semantics

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Introduction

Charles S. Peirce proposed a distinctive theory of the mind, regarding the human mind as a special kind of semiosis.[*1] Given the fact that Peircean semiotics is frequently referred to in a growing range of contemporary academic fields, it may well be argued that Peirce's theory of the mind can also be guaranteed its significance in the contemporary context. The attention paid to this theory by the contemporary philosophy of mind, however, seems insufficient. Even though there have been a couple of studies on Peirce's theory of the mind, it seems that no study has so far focused on connecting this theory to the contemporary context.[*2]

This article thus aims to provide a foundational scheme to reconsider Peirce's theory of the mind in the contemporary context. With this aim, this article would like to propose a Peircean theory of propositional attitudes. This is because it seems reasonable to relate Peirce's theory of belief and his pragmatic maxim to intensive discussion about propositional attitudes in the field of the philosophy of mind. Arguments elaborated in this article should be regarded as preliminary analysis for a forthcoming study on the contemporary applicability of Peirce's theory of the mind. (It could be argued, for example, that Peirce's theory of the mind suggests a view similar to the 'extended mind'[*3]; Peirce indeed argues that mental processes are not "shut up in a box of flesh and blood".[*4] Such an argument is, however, to be developed elsewhere.[*5]) This article thus intends to encourage both Peirce scholars and contemporary philosophers on the mind to cooperatively appreciate the potentialities of Peirce's theory of the mind.

The arguments of this article are developed in the following way. In the first section, Quine's insights into Peirce's pragmatism are reconsidered: these insights are useful to direct our discussion. It will be argued, however, that Quine's behaviouristic construal of Peirce's concept of belief needs to be amended. The second section generalises the Peircean theory of propositional attitudes. This theory adopts a functionalistic view instead of a behaviouristic view, and is a polyadic theory presupposing at least three parts: a propositional attitude, a representation of a given proposition, and an 'interpretant'. The third section tries to situate Peircean theory in the contemporary field of the philosophy of mind, by consulting with "Fodor's guide to mental representations".[*6] Several similarities between the Peircean theory and Fodor's theory of propositional attitudes can be pointed out; however, there can also be found a distinctive

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[*1] Peirce elaborates this idea in "Some Consequences of Four Incapacities" (*CP5*, 264-317; *EP1*, pp.28-55) and "The Law of Mind" (*CP6*, 102-63; *EP2*, pp.312-333). See also Colapietro (1989).

[*2] Savan (1981), Colapietro (1989) and Delaney (1979; 1993) are helpful preceding studies although they do not aim to directly connect Peirce's theory of mind to the contemporary discussion of philosophy of mind.

[*3] Clark and Chalmers, 1998.

[*4] *CP7*, 591.

[*5] See Kato (2015).

[*6] Fodor, 1985.

view of the Peircean theory. This view could be called 'Peircean-habit semantics', which is clarified in the fourth section. This article will thus demonstrate the contemporary significance of Peirce's theory of the mind, particularly that of the Peircean theory of propositional attitudes.

1 Quine's insights

As the outset, Quine's construal of Peirce's pragmatism is worthy of attention because it conveniently introduces two important subject matters.[*7] The first subject matter is a proposition. Quine argues that Peirce's theory of belief is proposition-centred. In "The fixation of belief", Peirce indeed states:

> The particular habit of mind which governs this or that inference may be formulated in a proposition whose truth depends on the validity of the inferences which the habit determines; and such a formula is called a *guiding principle* of inference.[*8]

The emphasised phrase "a *guiding principle* of inference" involves an important idea: it will be recaptured in the fourth section of the present article. It is sufficient for the moment to note that Peirce considers the establishment of habits as the essential feature of beliefs; the above sentence clearly supposes that beliefs may involve propositional formulation.[*9] Thus, Quine's first contention that Peirce's theory of belief is proposition-centred seems reasonable. Such a proposition-centred stance may suggest that Peirce's concept of belief can be reasonably connected to a contemporary discussion of propositional attitudes.

Secondly, Peirce's pragmatic maxim is expressed as follows:

> Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object.[*10]

According to this maxim, the meaning of a belief should be understood as "effects" or "practical bearings" the belief might have. It seems true that these "effects" or "practical bearings" form a collective disposition to act in a particular way; for example, the meaning of the belief that diamond is hard can be understood as the disposition to think that diamond "will not be scratched by many other substances".[*11] Quine thus argues that a given belief can be understood as a disposition to act in a particular way according to the pragmatic maxim, and he claims that Peirce's pragmatism is behaviouristic.

It should be noted, however, that such a disposition to act is just a particular subject's disposition. Consider the following case. Charles and William are looking at a certain star in the sky. Charles believes

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[*7] Quine, 1981.

[*8] *EP1*, p.112, Peirce's italicisation.

[*9] "The essence of belief is the establishment of a habit, and different beliefs are distinguished by the different modes of action to which they give rise" (*EP1*, p.129).

[*10] *EP1*, p.132.

[*11] *EP1*, p.132.

that this star is Hesperus and he is disposed to think about the astronomical fact that Hesperus is the planet Venus, thus believing that this star is the planet Venus. In this case, Charles's belief that this star is Hesperus can be understood as a disposition to believe that this star is the planet Venus. On the other hand, although William has the belief that this star is Hesperus, he does not pay any attention to the fact that Hesperus is the planet Venus; but being a great fan of Greek myths, he is disposed to think about the mythological fact that Hesperus is the son of Eos, thus believing that this star is the son of Eos. In this case, William's belief that this star is Hesperus is understood as the disposition to believe that this star is the son of Eos, instead of the disposition to believe that this star is the planet Venus. Having a given belief can thus lead to various behavioural dispositions, even if its belief holders (e.g. Charles and William) share the very same proposition: a given belief with a particular propositional content cannot simply be reduced into a determined disposition to act.[*12] If a given belief can be understood in different ways depending on its belief holders, such a belief cannot be understood as a fixed disposition: it would be, then, impossible to soundly develop syllogistic inferences based on such unstable beliefs. It therefore seems that Quine's second contention that Peirce's theory of belief is behaviouristic needs some revision.

The reason why one belief can be understood as different behavioural dispositions even when the object of belief (i.e. the proposition) does not change is that the relation between the subject of belief (i.e. the belief holder) and the proposition affects the fixation of the meaning of the belief. The present article does not intend to entirely reject Quine's behaviouristic construal of Peirce's pragmatic maxim: so far as we have argued, it would still be possible to construe the maxim as suggesting that a given belief is understood as a behavioural disposition *of each particular subject*. To do this, however, complementary study on relations between subjects and propositions is needed. A theory of propositional attitudes going along with Peirce's pragmatic maxim should thus be sought.

2 Peircean theory of propositional attitudes

Fodor criticises Carnap's behaviouristic theory of propositional attitudes, and argues that it needs to be revised into a functionalistic theory.[*13] This line of consideration is helpful to amend Quine's second contention and to construct a Peircean theory of propositional attitudes.

By definition, propositional attitudes are attitudes such as beliefs and desires which have propositional

[*12] Behaviourists might still argue that the belief that 'A is B' can be understood as a combination of conditional dispositions such as the disposition to believe that 'if B is C, then A is C,' and the disposition to believe that 'if B is D, then A is D,' and so forth. I actually think this idea may not be so far from Peirce's pragmati(ci)sm. However, this idea itself does not explain anything about how the subject of the belief that 'A is B' comes to focus on a particular condition: 'if B is D,' 'if B is C,' or another. 'Peircean-habit semantics', which is clarified in the fourth section, would be a theory to offer an explanation about this point.

[*13] Fodor, 1978.

objects (e.g. that-clauses). The attitudes should explain relations between subjects and propositional entities. Carnap assumes that these relations are relations between subjects and sentences the subjects are disposed to utter.[*14] Consider the following propositional attitude: Charles believes that a diamond is hard. Charles is the subject, and he has a disposition to utter the sentence 'a diamond is hard' if he believes this to be so. In this example the propositional attitude can be understood as a particular relation between Charles and the sentence: a propositional attitude 'Charles believes that a diamond is hard' explains the relation in which Charles is disposed to utter that 'a diamond is hard'. It should be noted that Carnap's approach is similar to Peirce's pragmatic maxim in that both refer to a disposition to act in a particular way, and therefore both might be considered as behaviouristic. Moreover, it might be arguable that this theory suggests a successful way to compatibly embrace both the proposition-centred stance and the behaviouristic understanding of propositional attitudes, by explaining propositional attitudes as dispositions to utter certain propositional sentences; also in this sense, Carnap's theory might seem helpful to construct a Peircean theory of propositional attitudes. Carnap's theory is, however, too limited and still needs to be amended. Beliefs are not mere dispositions to utter certain sentences, according to the pragmatic maxim: the belief that a diamond is hard, for example, should involve a disposition to think that a diamond "will not be scratched by many other substances".[*15]

Fodor's suggestion, then, should be considered. Fodor argues that Carnap should shift to a functionalist viewpoint; he argues that Carnap should consider that to believe a certain proposition is to let an internal representation of the proposition play a certain role in the causation of behaviours.[* 16] Internal representation is the key concept to amend Carnap's theory. An internal representation of a given proposition can be any sentence that represents the proposition: moreover, such a sentence can be either a natural language sentence or a non-natural language sentence. Fodor's suggestion is generalised as follows. A propositional attitude is a relation between a subject and an internal representation of a given proposition. An internal representation of a given proposition plays a certain causal role within a certain subject, and thus the subject is caused to behave in a particular way.

This suggestion leads to a successful Peircean theory of propositional attitudes according to which the pragmatic maxim is compatible with Peirce's proposition-centred stance. While the pragmatic maxim analyses a propositional attitude into a disposition to act in a particular way, the disposition can also be understood as a consequence of a certain role of an internal representation of the proposition that is the object of the attitude. Peirce's proposition-centred stance can thus be sustained by subscribing to the concept of 'internal representations' of propositions, without limiting the scope of the pragmatic maxim.

In this framework, internal representations occur within *a subject* of the attitude (e.g. a belief holder).

[*14] Carnap, 1947.

[*15] *EP1*, p.132.

[*16] Fodor, 1978.

There needs to be a third thing besides a propositional attitude and an internal representation of a given proposition: it can be called, as a first approximation, a subject's interpretation of the representation. The present article proposes considering subjects of attitudes as mental systems like human brains. It might sound strange to identify a mental system with a human subject, or for example, a belief holder; a complimentary explanation may be needed here. Peirce regards the human mind as a kind of semiosis, and tries to provide a distinctive explanation about self-identification based on his 'synechism', according to which there is no clear distinction between one self and another self.[*17] In this view, a belief holder is also understood as a semiosis, and can be considered as continuous with other semioses such as other people and other mental systems. Peirce's triadic account of semioses should be considered, then. Peirce argues that a semiotic process is composed of a representation, an object of the representation, and an 'interpretant'. Each semiosis such as a human brain is understood as a huge collection of such semiotic processes. Semioses interpret representations by reference to their 'interpretants'. Therefore, the third thing can be called an 'interpretant'; an internal representation of a given proposition represents the proposition by virtue of a certain interpretant. The representation plays, at the same time, a certain causal role by virtue of the same interpretant, and such roles may vary depending on interpretants.[*18]

Peirce's theory of belief can thus be reconstructed as follows. Suppose Charles believes that *p*. Charles refers to a certain interpretant, and a representation of a given proposition *p* plays a certain causal role by virtue of the interpretant. The propositional attitude 'Charles believes that *p*' can be understood as a relation between an internal representation of *p* and the interpretant that Charles refers to: at the same time, the attitude is analysed into a particular disposition according to the pragmatic maxim. In this theory, a representation of a given proposition can be either a natural language sentence or a non-natural language sentence; for example, a representation of the proposition that a diamond is hard can be either an English sentence 'a diamond is hard' or a particular pattern of electrical signals in Charles's brain (in the latter case, a computing machine run by electrical signals can be a metaphor of the brain). At the same time, a representation of the proposition that 'a diamond is hard' may play a certain role in causing certain utterances and thoughts. The disposition into which this example attitude should be analysed can therefore involve both Charles's disposition to utter a sentence such as 'a diamond is hard' and his disposition to think that a diamond "will not be scratched by many other substances".[*19]

To sum up this theory, at least three parts are in play: a propositional attitude, a representation of a

[*17] See also Colapietro (1989) and Kato (2015)

[*18] It might be arguable that the representation has two kinds of objects: the proposition and the disposition. The former object of the representation, the proposition, can be individuated by its role in the inferential network of propositions. The latter, the disposition is individuated by its role in the causal network of mental states. The relation between the inferential network and the causal network should be explained by 'Peircean-habit semantics' argued in the fourth section.

[*19] *EP1*, p.132.

given proposition, and an interpretant. A representation of a given proposition plays a certain causal role by reference to a particular interpretant, and thus propositional attitudes are regarded as the relations between interpretants and representations of propositions. The attitude can be analysed, at the same time, into a particular disposition according to the pragmatic maxim. This is the basic outline of the Peircean theory of propositional attitudes. Its significance in the context of the philosophy of mind is clarified in the following sections.

3 Fodor's guide

Fodor published a handy guide to philosophical areas relating to mental representations.[*20] Even though this guide may be antiquated, it is still helpful to set out our Peircean journey around such areas. Particularly because the Peircean theory of propositional attitudes is similar to Fodor's theory in that both may involve the concept of 'internal representations', Fodor's guide can be a suitable reference to roughly picture how the Peircean theory would be characterised in the context of the philosophy of mind. Fodor's guide asks several questions to classify competing positions in the field of the philosophy of mind: each position is located on a classifying tree depending on answers to these questions. In this section, such questions are applied to the Peircean theory.

3.1 Realist about propositional attitudes?

The first question is whether or not propositional attitudes exist. Fodor enumerates Dennett, Churchland, and Stich as philosophers who would answer 'no' to this question. Fodor himself is located on the 'yes' side. Peirce's answer should also be yes in respect of his proposition-centred stance. It might be arguable, however, that propositional attitudes such as beliefs and desires do not have to be real in the strict sense, but they are merely contrived as useful instruments to explain others' behaviour: such a position is called 'instrumentalism' about propositional attitudes, which Fodor classifies as one of the anti-realist positions about propositional attitudes.[*21]

Since Peirce has a peculiar concept of the reality, it is harder to answer this question than it looks. Imagine that you are holding a stone in your fist: you can predict that as soon as you open your fist, the stone will fall to the ground. In the fourth lecture at Harvard University in 1903, Peirce takes such an example and asks why this is predictable.[*22] Peirce continues his argument: everyone may have had so far

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[*20] Fodor, 1985.

[*21] It is Dennett's argument about intentional systems which Fodor (1985) mentions as "[t]he most extensively worked out version of instrumentalism". Although the present article supposes that Peirce would be a realist about propositional attitudes, the concept of an intentional system seems to be able to go along with Peirce's theory of the mind; the future study would probably focus on this topic. See also Dennett (1978; 1981).

[*22] *EP2*, pp.181-86.

uniform experiences in which a stone falls to the ground when he or she loosens their hold. Peirce argues that "every sane man" will suppose that "the uniformity with which stones have fallen has been due to *some active general principle*", and this uniformity suggests that "general principles are really operative in nature".[*23] Peirce approves of such consideration and calls it 'scholastic realism'. The Peircean theory of propositional attitudes supposes that propositional attitudes are real in the sense in which the scholastic realism admits the reality of general principles; propositional attitudes are real, because the causal roles of the attitudes are determined by the general principles "really operative" in the mind. In a future study, such a concept of the reality should be re-examined and compared with different contemporary concepts of the reality.[*24]

3.2 Functionalist?

The second question asked by Fodor's guide is whether or not to be a functionalist. Remember that Fodor criticises Carnap's behaviouristic explanation of propositional attitudes, and suggests that Carnap should shift to a functionalist viewpoint; Fodor himself is clearly a functionalist about propositional attitudes.[*25] In this context, functionalism means the doctrine according to which each mental state is individuated by reference to its causal role: mental states are explained in terms of their causal relations to inputs (e.g. certain stimuli to a brain) and outputs (e.g. certain responses). Peirce would also be a functionalist about propositional attitudes; as argued in the second section, 'interpretants' should be presupposed in the Peircean framework, and they can be understood as functions that produce certain outputs from certain inputs.

3.3 Are propositional attitudes monadic?

The guide then asks whether or not propositional attitudes are monadic. As Fodor points out, 'monadic' propositional attitudes may sound strange because propositional attitudes are, by definition, relations between subjects and propositional entities.[*26] Fodor's guide describes the monadic theory as the theory that identifies propositional attitudes with organisms' monadic functional states; causal roles the states should play in the organisms determine the types of the states, and the types of propositional attitudes are thus individuated. Fodor appropriately states, however, that this theory is merely "reducing the notion of

[*23] *EP2*, p.183, Peirce's italicisation.

[*24] Practical Realism (Baker, 1995) seems to go along with the Peircean theory. Baker argues that a propositional attitude is "a global states of a whole person" (*ibid*, p.153) and that whether a person S has a particular propositional attitude is determined by 'what S would do'. For example, there should be counterfactuals "sufficient for S's belief that Clinton is president", which may be counterfactuals such as "[i]f S were asked who was president, and S understood the question, and S wanted to be cooperative, S would respond by saying that Clinton is president" (*ibid*, p.159). In the Peircean framework, such counterfactuals could be regarded as "really operative" (*EP2*, p.183) in a person (or a semiosis) S.

[*25] Fodor, 1978.

[*26] Fodor, 1985.

propositional content to the notion of causal role".[*27] The monadic theory does not explain anything about how propositional attitudes have propositional contents. Fodor thus repudiates the monadic theory and argues for the polyadicity of propositional attitudes. The Peircean theory would also prefer the polyadic explanation to the monadic one, because, as we have argued above, it presupposes at least three things to explain a propositional attitude: a propositional attitude, a representation of a given proposition, and an interpretant.

3.4 Where does the semanticity of attitudes arise from?

The last question asked in the guide is about the source of semanticity of attitudes. There is a semantic network of propositions, which seems determined by the inferential relations between propositions; for example, the proposition that X and Y should entail the proposition that X and the proposition that Y; the proposition that Mary left and John wept entails the proposition that Mary left and John did something, the proposition that Mary left, the proposition that someone did something, and so forth. The functionalism argued so far, on the other hand, assumes that attitudes are individuated by reference to their causal roles; each attitude can be identified with a particular location in the network of causal relations. The question is, then, how to interrelate the two networks, namely, the causal network and the inferential (or semantic) network, to each other. The same point may well be asked as follows: how can propositional attitudes, having been understood from a functionalistic point of view, gain their semanticity? The Peircean theory of propositional attitudes needs to be able to explain the semanticity of attitudes in order to deal with propositions and enable sound inferences to proceed. The last question of Fodor's guide is therefore the right question for the Peircean theory of propositional attitudes as well.

A possible answer to the question might be as follows. There seem to be isomorphisms between the causal network and the inferential network, because causal relations usually coincide with inferential relations. For example, if Charles believes that a particular star in the sky is Hesperus and thinks that Hesperus is the planet Venus, then he will conclude that the star is the planet Venus. In this case, Charles' belief and thought cause the conclusion, and this causation coincides with a sound syllogistic inference. Considering such isomorphisms between causal relations and inferential relations, it possibly seems a reasonable idea that attitudes gain their semanticity by virtue of the isomorphisms. Such a consideration leads to 'functional-role semantics' ('FR semantics,' here after). FR semantics assumes that the semanticity of attitudes arises from the isomorphisms between the causal network of propositional attitudes and the inferential network of propositions.

The last question is in effect asking whether or not to accept FR semantics. Fodor clearly shows reluctance to accept FR semantics because it may involve burdensome drawbacks, some of which will be considered in the next section. The present article would like to argue that the Peircean theory has a

[*27] *ibid*.

distinctive story to tell about the establishment of the semanticity of attitudes. 'Peircean-habit semantics', instead of FR semantics, is thus proposed.

4 Peircean-habit semantics

The previous quotation from "The fixation of belief" should be recalled here:

> The particular habit of mind which governs this or that inference may be formulated in a proposition whose truth depends on the validity of the inferences which the habit determines; and such a formula is called a *guiding principle* of inference.[*28]

This sentence says that inferential relations are determined by a particular "habit of mind" and that the habit formulated in a proposition is called a "guiding principle" of inference. Accordingly, it seems that the establishment of the habit of mind or the guiding principle leads to the establishment of inferential relations and thus that of the semanticity of propositional attitudes.

The concept of habit means a established tendency to act in a particular way; Peirce states that "[w]hat the habit is depends on when and how it causes us to act".[*29] Although there are several explanations by Peirce about the process of establishment of habits, the following passage written in 1907 may be the most straightforward:

> […] multiply reiterated behavior of the same kind, under similar combinations of percepts and fancies, produces a tendency, ---the habit,--- actually to behave in a similar way under similar circumstances in the future.[*30]

The point is that the reiteration of the same kind of behaviour leads to the establishment of habits.

It should be noted here that Peirce associates such a process of reiteration with the inferential process of induction. Peirce supposes that there are three kinds of inference: deduction, induction, and hypothetic inference called abduction or retroduction. In "The law of mind", Peirce argues that each of them corresponds to each of three kinds of mental action.[*31] The mind carrying out deduction is dominated by established habits; deduction corresponds to the habitually determined association of sensations and reactions in the mind. On the other hand, induction and abduction correspond to the process of establishing habits. This process can be described as follows. One has various sensations on innumerable occasions. However, as the occasions on which a particular group of sensations are followed by a certain reaction accumulate, one general idea starts to be established, and this general idea unites the sensations. In this process, two kinds of mental action are pointed out: (1) observation of the fact that a particular group of

[*28] *EP1*, p.112, Peirce's italicisation.
[*29] *EP1*, p.131.
[*30] *EP2*, p.413.
[*31] *CP6*, 102-63; *EP2*, pp.312-333.

sensations are followed by the same reaction and (2) suggestion of the general idea under which the sensations are united. Induction corresponds to the former: the hypothetic inference, or abduction, corresponds to the latter. The observation continues even after the suggestion of the general idea in order to check if the idea plausibly works; abduction proposes the general idea, and induction evaluates and confirms it. With abduction and induction, thus, it becomes possible to say that a particular group of sensations, which are to be united under one general idea, establish a habit of leading to a certain reaction.

It may be helpful to describe this sequence of three inferential processes of mind in the order in which the mind carries out each process. Peirce's summary of the sequence of three inferential processes of the mind is as follows:

> Thus, by induction, a number of sensations followed by one reaction become united under one general idea followed by the same reaction; while by the hypothetic process, a number of reactions called for by one occasion get united in a general idea which is called out by the same occasion. By deduction, the habit fulfills its function of calling out certain reactions on certain occasions.[*32]

Induction and abduction (or "the hypothetic process") occur in tandem. Induction collects observational facts that certain sensations are followed by a certain reaction, and at the same time, abduction brings about a general idea that would unite the sensations. Thus, on certain occasions that involve a certain general idea, certain reactions are to be provoked. Peirce explains a habit as a "specialisation of the law of mind whereby a general idea gains the power of exciting reactions".[*33] As the facts collected by induction accumulate, the general idea suggested by abduction becomes more certified and "gains the power of exciting reactions"; a habit is thus established. Then, the habit comes to function in the mind and dominates the association of sensations and reactions; this process dominated by the habit is called deduction.

If this view is accepted, since the process of induction and abduction establishes the habits, the causal network of propositional attitudes can be regarded as deriving from induction and abduction. It should be noted that neither induction nor abduction is a necessary inference, but merely a probable one; the causal network of propositional attitudes can be considered as deriving from probable inferences instead of the rigid logical relations of propositions. It is also arguable that even *an* inferential network of *representations* of propositions in a particular mind, which might have been considered as conforming to the rigid logical rules, can now be considered as merely one of the most robustly established habitual networks in the mind. If so, the process in which isomorphic relations become established between the causal network of propositional attitudes and the inferential network of *representations* of propositions can be explained as the process of the establishment of habits advanced by induction and abduction. This view does not assume that there are isomorphisms between the causal network of propositional attitudes and the inferential network of propositions, but argues that isomorphic relations can be established between the causal

[*32] *EP1*, p.329.
[*33] *EP2*, p.328.

network of propositional attitudes and the inferential network of *representations* of propositions. In this sense, the attitudes can gain their semanticity by the process of induction and abduction. It is this story that the present article would like to call 'Peircean-habit semantics' ('PH semantics,' for convenience).

This article proposes PH semantics as an alternative to FR semantics. FR semantics involves serious drawbacks, and therefore Fodor suggests giving up this view.[*34] PH semantics can, on the other hand, be free from the drawbacks. The most fundamental drawback of FR semantics is the problem of underdeterminacy: FR semantics presupposes isomorphisms between the causal network and the inferential network, but it is dubious if the pairing of causal roles of attitudes and inferential roles of propositions can be fixed in a definite way. There are a number of cases in which causal dispositions of attitudes do not correspond with the consequence of logical inferences; for example, some can easily commit the 'Gambler's fallacy'. The transition of mental states in the causal network may seem to reflect the inferential network of propositions to some extent, but not perfectly. The allegedly isomorphic relations between the causal and the inferential are thus underdetermined. It might still be possible to insist that some isomorphic relations exist; however, it is unclear how and to what extent such isomorphic relations, if any, could be established. With PH semantics, the problem of underdeterminacy of isomorphisms between the causal network and the inferential network is no longer a crucial matter. This is because PH semantics does not directly relate the semanticity of propositional attitudes to the inferential network of propositions, but supposes that the semanticity derives from the process of establishment of habits which involves probable inferential processes: induction and abduction. This means that even though the causal roles of attitudes may reflect the inferential roles of mental representations of given propositions, they would not necessarily correspond with the determinate logical relations of the propositions. PH semantics can thus take into account causal relations between propositional attitudes that do not strictly obey the logical rule for corresponding propositions.

Secondly, FR semantics ends up failing to naturalise propositional attitudes. It may be true that FR semantics is an explanation of the pairings of mental states (as attitudes) and propositions; however, it does not tell anything about how the propositions (or more precisely, representations of the propositions) gain their semantic properties. It just stipulates the semantic properties as such. Fodor properly describes this point: "FR semantics has a lot to say about the mind-to-proposition problem but nothing at all to say about the mind-to-world problem".[*35] PH semantics, on the other hand, has something to say about "the mind-to-world problem". It does involve an explanation of the process in which habits are established and mental representations of propositions gain their semantic properties. In the process of habit-taking, the mind must observe actual phenomena in the world, make hypothetical inferences, and again, observe whether the hypotheses work well: the reiterated use of good working hypotheses leads to the establishment

[*34] Fodor, 1985.
[*35] *ibid.*

of habits. If PH semantics is accepted, the semanticity of mental representations can be understood through the process of interactions of the mind and the world, and thus the causal network of attitudes can be naturalised as a transition network of mental states with mental representations as inputs.

Lastly, Fodor's Concept Atomism can also be mentioned to evaluate PH semantics. After rejecting FR semantics, Fodor focuses efforts on criticising several kinds of Concept Pragmatism, and proposes Concept Atomism instead.[*36] Concept Pragmatism assumes that concepts can be individuated by reference to the roles these concepts play in the cognitive process of possessors of the concepts (e.g. causal roles and/or inferential roles of the concepts). On the other hand, Fodor argues that the concept of X should simply be "the concept that represents" X, and proposes not bothering anymore with such a wrong question as "What individuates concepts?" The right question should be, Fodor claims, "How do mental representations represent?" Fodor's criticism of Concept Pragmatism should be re-examined elsewhere, and it might be proved to be doubtful whether his criticism is applicable to Peirce's pragmati(ci)sm. At any rate, it can be noticed for the moment that since PH semantics is a theory to explain the process in which representations gain their semanticity, it involves an answer to "the right question": how do mental representations represent?

Much more elaborated arguments must be made for (and against) the PH semantics. The present article would like to just suggest for future study that PH semantics is worth considering as an alternative to FR semantics, which can be a positive contribution of the Peircean theory to the contemporary philosophy of mind.

Conclusion

This article can be regarded as an attempt to arrange for Peirce to travel around the contemporary field of the philosophy of mind. In this tour, we consulted Fodor's guide because the Peircean theory of propositional attitudes was expected to be similar to Fodor's theory; it has been argued that the Peircean theory should involve a functionalistic view, and that a polyadic understanding of attitudes is preferable. Meanwhile, a possible contribution of the Peircean theory to the contemporary philosophy of mind has been pointed out: namely, PH semantics. The causation of attitudes does not have to strictly obey the logical rules for propositions: PH semantics suggests the potential to study the causations of attitudes that seem to slip through the determinate logical network. PH semantics is still in its early stages of development, and obviously needs more scrutiny. For now, however, it may be helpful to assume that the way to further discussion which will be rewarding for both Peirce scholars and researchers on the philosophy of mind will be opened in the direction that this article has suggested.

[*36] Fodor, 1994.

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