



Hume's Conceivability Arguments Reconsidered

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Abstract

This paper examines Hume's formulations and uses of the conceivability principle (abbreviated as CP: Whatever is conceivable is possible) and the inconceivability principle (abbreviated as ICP: Whatever is inconceivable is impossible). In Hume's works, we identify different versions of CP and ICP, including proper CP, proper ICP, the weak versions of CP and ICP, the epistemic versions of CP and ICP, and show that Hume not only expresses ICP, but also really maintains it. Assuming an axiomatic characterization of modalities, we argue that if there is a sharp distinction between levels of modalities, then Hume's conceivability arguments do not hold. But, in a rather different way, we also argue that if Hume's conceivability arguments hold, then there should be no distinction between levels of modalities. Finally, we argue that after Hume, there are lots of endeavors in logic and philosophy to distinguish different levels of modalities, and to accept new concepts of necessity other than logical necessity.

Keywords The conceivability principle · The conceivability argument · Causality · The uniformity of nature · Inductive inference · Skeptical argument

The conceivability principle, abbreviated as CP, has been widely discussed in contemporary philosophy. CP asserts that whatever is conceivable is possible, especially in the metaphysical sense. Conceivability argument usually goes as follows: given that nothing can exist without itself, if a is b (viz. $a=b$), then a cannot exist without b ; presumably, if it is conceivable that a exists without b , then it will be metaphysically possible that a exists without b , it further follows that a and b are actually distinct. Supposing the above argument is sound, if conceivability is a reliable guide to possibility, then the

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mere conceivability of a 's existence without b will be sufficient to establish the possibility of a 's existence without b , which will in turn be sufficient to establish the actual distinctness of a and b . Consequently, the conceivability argument is very powerful but highly controversial in contemporary philosophy. As far as we know, Hume might be the first to articulate CP, and to apply it to his skeptical arguments against causal relation, inductive inference and many other issues. Before us, there are scholars who have discussed Hume's formulations and uses of conceivability principle, e.g., Hartmann (1938, 2013), Casullo (1979), Hetherington (1991), Lightner (1997), Kail (2003), Dohrn (2010), Woudenberg (2006), Garrett (2008). In this paper, we will present our critical review of Hume's conceivability principles and conceivability arguments.

1 The Axiomatic Characterization of the Concepts of Modality

First, in order to explain and evaluate Hume's CP and his conceivability arguments, we review the classification and characterization of various modal concepts. In contemporary logic and philosophy, "necessity," "possibility" and "impossibility" are together called "modalities." Here we assume an axiomatic characterization of modalities, that is, modalities are hierarchical and divided into various levels on the basis of axioms or rules in different disciplines, here "axioms" refer to those basic true propositions in some areas of knowledge, "rules" are used to guide our deduction from the axioms. The constraints on modality are superimposed gradually, from less to more, from permissive to strict.

Logical modality is relative to logical axioms or rules. Given that logical axioms and rules are necessary truths, a proposition is logically possible if and only if (hereafter, "*iff*" for short) it has no contradiction with logical axioms or theorems, where a logical theorem logically follows from logical axioms and rules. Here we assume that there are certain consensus among logicians about a sharp boundary between logical and non-logical axioms, between logical and non-logical rules. We will return to such a boundary later.

Mathematical (metaphysical or physical) modality is relative to mathematical (metaphysical or physical) axioms. Given that mathematical (metaphysical or physical) axioms are mathematically (metaphysically or physically) necessary truths, a proposition is mathematically (metaphysically or physically) possible *iff* it has no contradiction with mathematical (metaphysical or physical) axioms or theorems, where a mathematical (metaphysical or physical) theorem logically follows from mathematical (metaphysical or physical) axioms. In other words, a proposition is mathematically (metaphysically or physically) possible *iff* it is logically consistent with mathematical (metaphysical or physical) axioms, that is, no contradiction logically follows from this proposition plus mathematical (metaphysical or physical) axioms. Here again, we assume that there are certain consensus among mathematicians (metaphysicians or physicists) about a sharp boundary between mathematical and non-mathematical (metaphysical and non-metaphysical, or physical and non-physical) axioms. We will return to such a boundary later as well.

The understanding of "physical modality" is divided into a narrow sense and a broad one. According to its narrow sense, "physical laws" only refer to laws

of physics. Then, laws of chemistry and biology are neither “physical laws” nor relevant to “physical modality.” According to its broad sense, “physical world” is the natural world where we live; thus, “physical laws” are those about various objects and phenomena in the natural world, including laws of chemistry, of biology, and so on. In the literature of philosophy, “physical modality” in its broad sense is also called “nomological modality.” In this article, we will concern with “physical modality” in its broad sense.

It is also mentioned that there are epistemic modalities relative to a cognitive subject (an individual or a community). Since the knowledge a cognitive subject possesses is always in the process of change and growth, epistemic modality relative to her is not stable. For example, before Russell’s paradox is found, the paradox is not in the range of epistemic possibility with respect to Frege. When writing his masterpiece *Basic Laws of Arithmetic*, Frege did not know the possibility that his system will lead to the paradox. If he knew this possibility, and still maintained to publish his writings, he would be insincere in his academic research. The actual situation is completely the opposite: when knowing that his system leads to the paradox, he tried his best to repair his system; when being despair of the possibility of a reasonable remedy, he gave up his logicist project, i.e. to deduce mathematics from logic. According to the axiomatic characterization of modalities above, it is assume that if the knowledge or beliefs of a cognitive subject could be axiomatized, then it is plausible to talk about epistemic possibility. That is, epistemic modality is relative to epistemic axioms (laws) relative to a subject. Given that epistemic axioms are epistemically necessary truths, a proposition is epistemically possible *iff* it has no contradiction with epistemic axioms relative to the subject.

The modal concepts mentioned above could be further explained only in terms of the concept of possibility. The requirement of logical possibility is minimal: if, from logical axioms and rules, a proposition does not logically lead to a contradiction, it is logically possible. Mathematical possibility is stronger than logical one, since mathematical axioms (as non-logical) are stronger than logical ones. For similar reasons, metaphysical possibility is stronger than mathematical one, and physical possibility is stronger than metaphysical one. Because epistemic possibility is relative to axioms of a subject’s knowledge, such a possibility may be stronger or weaker than logical (mathematical, metaphysical or physical) possibility, which depends on whether axioms of his knowledge are stronger or weaker than logical (mathematical, metaphysical or physical) axioms.

Consider the following examples about various kinds of possibilities:

- (1a) Tian’anmen Square is both square and non-square.
- (1b) The speed of a high speed rail is as fast as that of a flight.
- (1c) Eiffel Tower is both red and black at the same time.
- (1d) The Great wall is made of rock and non-extended.
- (1e) The speed of space shuttle is faster than that of light.
- (1f) One person pulls himself up to the sky by pulling his own hair.
- (1g) There are only two planets in the solar system.
- (1h) Every even integer greater than 2 can be expressed as the sum of two primes.

- (1i) It is not the case that every even integer greater than 2 can be expressed as the sum of two primes.

Here, (1a) is logically impossible; thus, it is mathematically, metaphysically and physically impossible. (1b) is physically possible, thus it is logically and metaphysically possible. (1c) and (1d) are logically and mathematically possible but metaphysically and physically impossible. (1e) and (1f) are metaphysically possible but physically impossible. (1g) is metaphysically possible but epistemically impossible, if, according to our current astronomical knowledge about the solar system, we do know that (1g) is false. (1h) and (1i) are respectively Goldbach conjecture and its negation, both of which are mathematically and epistemically possible, since, according to our present mathematical knowledge, we do not know which one is false; but only one of them is logically possible even though we do not know which one is so.

In our view, Hume does not distinguish so various concepts of modality. He only has modal concepts such as logical and epistemic necessity/possibility. In what follows, we will show that it is feasible for Hume to challenge the validity of inductive inference by means of logical or epistemic modalities, but it is inconvincible and ineffective by the very same means for him to challenge the necessity of causal relation, the uniformity of nature, factual truths, and the existence of external objects. That is, if Hume does not formulate a hierarchy of modalities, then many of his conceivability arguments fail to accomplish their tasks.

2 Hume's Multi-formulations of Conceivability Principle

According to our (perhaps not complete) statistics, Hume expresses or uses conceivability principle 17 times in *A Treatise of Human Nature*, 3 times in *An Abstract of a Treatise of Human Nature*, at least 4 times in *An Enquiry Concerning Human Understanding*, and many times in *Dialogues Concerning Natural Religion*.

It is an established maxim in metaphysics, *that whatever the mind clearly conceives, includes the idea of possible existence*, or in other words, *that nothing we imagine is absolutely impossible*. We can form the idea of a golden mountain, and from thence conclude that such a mountain may actually exist. (Hume 1975, T 1.2.2.8, italics original)

Whatever we conceive is possible, at least in a metaphysical sense. (Hume 1938, A 12)

For as nothing which he clearly conceives could be esteemed impossible or implying a contradiction, every chimera of his fancy would be upon an equal footing; nor could he assign any just reason why he adheres to one idea or system, and rejects the others which are equally possible. (Hume 1935, DNR 2.12)

According to the above citations, Hume understands the conceivability principle as follows:

CP Whatever is conceivable is possible, especially in the metaphysical sense

When formulating CP as a metaphysical maxim, Hume adds up: “We can form no idea of a mountain without a valley, and therefore regard it as impossible” (Hume 1975, T 1.2.2.8). It seems that he also formulates the inconceivability principle, which says that inconceivability implies impossibility, since, for him, “form the idea of” is always interchangeable with “imagine” or “conceive.”

ICP Whatever is inconceivable is impossible

However, there is a debate about whether Hume maintains ICP (See Casullo 1979; Dohrn 2010; Hetherington 1991; Powell 2013; Woudenberg 2006). Some scholars do not accept that Hume also formulates ICP, for the supporting citation seems only an isolated case in his works, and he does not infer their impossibility from other unconceivable things such as the vacuum. In what follows, we will show that Hume really holds ICP, so these scholars are wrong in this point.

In order to accurately understand CP and ICP, we need to examine how Hume uses such words as “conceivable,” “imagine,” and “possible.” According to Hume, to conceive is to clearly and distinctly conceive: “nothing of which we can form a clear and distinct idea is absurd and impossible” (Hume 1975, T 1.1.7.6); “To form a clear idea of anything, is an undeniable argument for its possibility” (Hume 1975, T 1.3.6.6); “whatever can be conceiv’d by a clear and distinct idea necessarily implies the possibility of existence” (Hume 1975, T 1.2.4.11). Furthermore, a clear and distinct idea is just an idea involving no contradiction: “now whatever is intelligible, and can be distinctly conceived, implies no contradiction” (Hume 2000, EHU 4.18); “how any clear, distinct idea can contain circumstances, contradictory to itself, or to any other clear, distinct idea, is absolutely incomprehensible; and is, perhaps, as absurd as any proposition, which can be formed” (Hume 2000, EHU 12.20). Thus, we have the following weak version of CP and ICP.

WCP Whatever is coherently conceivable without contradiction is possible

WICP Whatever implies logical contradiction and is inconceivable is impossible

There is textual evidence for WCP and WICP: “It is in vain to search for a contradiction in any thing that is distinctly conceived by the mind. Did it imply any contradiction, it is impossible it could ever be conceived” (Hume 1975, T 1.2.4.11). For example, because a golden mountain involves no logical contradiction, it is conceivable and thus possible in the metaphysical sense. But because a mountain without valley involves a contradiction, it is inconceivable and thus impossible in the metaphysical sense.

Besides, Hume also provides an epistemic interpretation for “conceivability” and “inconceivability:” the conceivable is “what can be conceived given our actual stock of simple ideas to draw upon and our unlimited ability to separate and combine our ideas,” then we obtain the following epistemic version of CP:

ECP given that we have the unlimited ability to separate and combine our simple ideas, whatever is conceivable by us is possible

There is textual evidence for ECP: “nothing is more free than the imagination of man; and though it cannot exceed that original stock of ideas, furnished by the internal and external senses, it has unlimited power of mixing, compounding, separating, and dividing these ideas, in all the varieties of fiction and vision” (Hume 2000, EHU 5. 2. 1).

Similarly, Hume also formulates the epistemic interpretation of “inconceivability,” which is caused by the limitation of our cognitive ability and the lack of our cognitive resources. For example, a born blind fails to conceive a particular color; a deaf from childhood is unable to conceive a particular melody; a man cannot conceive the taste of pineapple if he does not have such experience; “it is impossible to conceive either a vacuum and extension without matter, or a time, when there was no succession or change in any real existence” (Hume 1975, T 2.1.4.3). If understanding “inconceivability” this way, we will obtain the following epistemic version of the inconceivability principle:

EICP what is inconceivable due to the limitation of our cognitive ability and the lack of our cognitive resources, is impossible

Such epistemic version of the inconceivability principle does not hold even from Hume’s own standpoint. In his view, human thinking cannot go beyond the scope of sensory experience, and we can only know what our sensory experience tells us. We cannot make any judgment about what actually or possibly exists beyond the scope of sensory experience. Under such circumstances, we have no choice but to suspend our judgments about these matters, since any determinate conclusion is sort of dogma. But Hume still makes some assertions about them, see the new Hume debate (Read and Richman 2000).

According to the above interpretation, “conceivability” means “involving no contradiction,” while “inconceivability” means “involving a contradiction.” Thus, CP and ICP will face different situations. CP will mean that whatever involves no contradiction is conceivable and thus possible. Obviously, “possibility” here is logical possibility, which is the weakest among various kinds of possibility: something may be logically possible but metaphysically impossible, for example, a thing is red and non-extended; something may be logically possible but physically impossible, for example, one person pulls himself up to the sky by pulling his own hair. Hume regards CP as a metaphysical maxim, which concerns metaphysical possibility; then CP does not hold generally, because logical conceivability only entails logical possibility rather than metaphysical, physical, or epistemic ones. ICP will imply that whatever involves logical contradictions is inconceivable and thus impossible, here “impossible” obviously means “logically impossible,” then ICP holds generally instead, for logical impossibility entails any other kind of impossibilities, such as metaphysical, physical and epistemic ones.

3 Hume’s Argument against the Necessity of Causation by Appealing to CP

According to Hume, a causal relation consists of four elements: (1) temporal priority, that is to say, cause comes before effect; (2) spatial–temporal proximity, that is, cause and effect are close to each other in space and time; (3) constant

conjunction, that is, there may be the same cause-effect sequence on numerous locations; (4) inevitable connection, that is, there is a necessary connection between cause and effect. Among them, “inevitable connection” is not found in empirical observations. Hume presents a philosophical thesis: “There must be a reason for everything that begins to exist,” and asserts that “it can be immediately proven that the aforementioned proposition is not intuitive. There is also no certainty of the proof” (Hume 1975, T 1.3.3.3). In what follows, we shall carefully look at his argument for his assertion that there is no proof for the truth of that proposition.

When discussing causal necessity, Hume mentions a maxim in philosophy: “whatever begins to exist, must have a cause of existence,” and claims that “here is an argument, which proves at once, that the foregoing proposition is neither intuitively nor demonstrably certain” (Hume 1975, T 1.3.3.3). We shall only focus on his argument for the assertion that the proposition lacks the certainty of demonstration below.

We can never demonstrate the necessity of a cause to every new existence, or new modification of existence, without shewing at the same time the impossibility there is, that any thing can ever begin to exist without some productive principle; and where the latter proposition cannot be proved, we must despair of ever being able to prove the former. Now that the latter proposition is utterly incapable of a demonstrative proof, we may satisfy ourselves by considering that as all distinct ideas are separable from each other, and as the ideas of cause and effect are evidently distinct, it will be easy for us to conceive any object to be non-existent this moment, and existent the next, without conjoining to it the distinct idea of a cause or productive principle. The separation, therefore, of the idea of a cause from that of a beginning of existence, is plainly possible for the imagination; and consequently the actual separation of these objects is so far possible, that it implies no contradiction nor absurdity; and is therefore incapable of being refuted by any reasoning from mere ideas; without which it is impossible to demonstrate the necessity of a cause. (Hume 1975, T 1.3.3.3)

It should be noted that Hume uses “cause” and “productive principle” interchangeably; for example, “the distinct idea of *a cause or productive principle*.” Let p be the claim “anything cannot ever begin to exist without some productive principle.” Logically, p is equivalent to the claim “‘for anything, if it begins to exist, there is a cause’ is necessary.” Let q be the claim “there must be a cause for all things that come into existence.” And p is logically contradictory with the proposition “‘a thing comes to exist with no cause’ is possible,” which is thus symbolized as $\neg p$ (the negation of p). Hume’s argument that the proposition q is lack of demonstrative certainty consists of a main argument and a subordinate one:

Main Argument:

- (3a) If we cannot prove p , we cannot prove q ;
- (3b) We cannot prove p indeed;

(3c) Therefore, there is no way for us to prove q .

The conclusion of the main argument is to say, the proposition q does not have the demonstrative certainty. Whether the main argument holds depends on whether premise (3b) holds.

Subordinate Argument: Its purpose is to demonstrate that the premise (3b) of the main argument holds.

- (3a') All distinct ideas are separable from each other;
- (3b') The idea of cause is obviously distinct from that of effect;
- (3c') Therefore, the idea of cause is separable from that of effect.
- (3d') It is conceivable without contradiction that a thing begins to exist without a cause;
- (3e') CP: whatever is conceivable is possible;
- (3f') Thus, "a thing begins to exist without a cause" is possible (i.e. $\neg p$).
- (3g') Therefore, we can't refute $\neg p$ a priori.
- (3h') Therefore, we can't prove p a priori.

It should be noted that two concepts "the necessity of causal inference" and "the necessity of causal relation" are completely different. The former is concerned with the "logical necessity" of causal inference, which means that in a causal inference, if its premises are true then its conclusion must be true, that is to say, it is logically impossible that its premises are true but its conclusion is false. Therefore, if we can prove that, it is logically possible that in a causal inference, its premises are true but its conclusion is false, we will prove that causal inference is not logically necessary. "Logical possibility" is easy to obtain: as long as a proposition is conceivable without contradiction, the proposition is logically possible. Specifically, it is easy to conceive non-contradictorily a cause without a particular effect, so the latter is logically possible. Therefore, there is no logical necessity in the inference from cause to effect. But "the necessity of causal relation," for examples, "Friction generates heat," and "all humans are mortal," is obviously not logically necessary, but it is necessary in the actual world so that we may call it either metaphysical or physical necessity. Let c be a proposition about a cause, e a proposition about an effect of the cause. To refute that " $c \rightarrow e$ " (if c then e) is metaphysically or physically necessary, it is not sufficient to just prove that " $c \wedge \neg e$ " (c but not e) is logically possible; it is required to prove that " $c \wedge \neg e$ " is metaphysically or physically possible. But in (3d') of Hume's subordinate argument, the only restriction made on conceivability is without logical contradiction; thus such conceivability is a logical one, which only implies logical possibility rather than metaphysical or physical one. Thus the proposition that " $c \wedge \neg e$ " is metaphysically or physically possible has not been proven, so the proposition that " $c \rightarrow e$ " is metaphysically or physically necessary has not been rejected either.

Therefore, Hume's subordinate argument falls into a dilemma: if the argument holds, it will only prove that causal relation is not logically necessary, but this conclusion is trivial, since nobody thinks oppositely; if it is used to prove the non-trivial

conclusion that causation does not have metaphysical or physical necessity, then his argument does not accomplish its task. Thus, Hume's main argument for the claim that the existence of causality is not necessary does not hold, because one of its premises (3b) has not yet proven.

4 Hume's Argument against the Uniformity of Nature by Appealing to CP

The principle of the uniformity of nature says that there are internal orders, structures, and laws that govern various natural phenomena, that the natural process remains unchanged in its totality, and that what happens in the past will continue to happen, under similar circumstances, in the future. This principle and the universal law of causation constitute the theoretical basis of inductive inference.

Hume puts forward a skeptical argument against the principle of the uniformity of nature:

Our foregoing method of reasoning will easily convince us, that there can be no demonstrative arguments to prove, that those instances, of which we have had no experience, resemble those, of which we have had experience. We can at least conceive a change in the course of nature; which sufficiently proves, that such a change is not absolutely impossible. To form a clear idea of any thing, is an undeniable argument for its possibility, and is alone a refutation of any pretended demonstration against it. (Hume 1975, T 1.3.6.5)

That there are no demonstrative arguments in the case, seems evident; since it implies no contradiction, that the course of nature may change, and that an object, seemingly like those which we have experienced, may be attended with different or contrary effects. May I not clearly and distinctly conceive, that a body, falling from the clouds, and which, in all other respects, resembles snow, has yet the taste of salt or feeling of fire? Is there any more intelligible proposition than to affirm, that all the trees will flourish in DECEMBER and JANUARY, and decay in MAY and JUNE? (Hume 2000, EHU 4.18)

Hume's above argument can be reconstructed in the following way:

- (4a) If the principle of the uniformity of nature holds, then the natural process will remain unchanged.
- (4b) It is conceivable without contradiction that a change in the natural process occurs. For example, something falls in the sky like snow, but tastes salty and touches fiery; all the trees flourish in December and January, and wither in May and June. All these ideas are not contradictory.
- (4c) CP: whatever is conceivable is possible.
- (4d) Therefore, it is possible that the natural process is changed.
- (4e) Thus, the principle of the uniformity of nature does not hold.

The problem here is similar to that in his challenge to the necessity of causal relation: since conceivability is easily accessible for humans, everything is conceivable if

it involves no (logical) contradiction. According to CP, (4d) is derived from (4b); but the possibility in (4d) is only a logical one: it is logically possible that the natural process is changed. But the principle of the uniformity of nature is a law about the actual world: how can such a principle be refuted only by an assertion with mere logical possibility? To refute the principle of the uniformity of nature, it is also required to prove: it is not only logically possible but also metaphysically or physically possible that the natural process is changed. For example, under the present physical laws, the following assumption is not only logically possible, but also physically possible: if a large ball *A* hit a small ball *B* with a high speed, it would be possible that both of them stopped, or *B* stopped and *A* were knocked out, or even both turned into butterflies and flew away. But in all of Hume's works, he does not provide such kind of proofs. In our view, how can a proposition about the actual world (e.g. the sun will rise from the east tomorrow) be refuted by a proposition being logically conceivable without contradiction (e.g. the sun will rise from the west tomorrow)? Alternatively, how can a physically necessary proposition (e.g. it is impossible that perpetual motion machine exists) be refuted by a proposition being logically conceivable without contradiction (e.g. someone invents a perpetual motion machine)? As Putnam points out, "...the 'conceivability' of a perpetual motion machine has nothing to do with its possibility. Perpetual motion machines may be conceivable, but they aren't physically possible. And, assuming high school chemistry, 'water that isn't H₂O' may be conceivable, but it isn't (physically or chemically) possible." (Putnam 1992, 57)

5 Hume's Argument against the Necessity of Inductive Inference by Appealing to CP

Hume makes uses of "probable inference" or "causal inference" to name what we call "inductive inference" today. In *An Enquiry Concerning Human Understanding*, he discusses the so-called "inductive and predictive reasoning."

So long it is observed that the sun rises from the east every day.
Thus, the sun will rise from the east the next day.

Or

So long it is observed that fire is hot.
It is fire.
Thus, it is hot.

The common character of various kinds of inductive inference is that a proposition about the unobservable is inferred from a proposition about the observable so far. Hume's discussion about "predictive reasoning" is applicable to other forms of inductive inference. He claims:

But no inference from cause to effect amounts to a demonstration, of which there is this evident proof. The mind can always conceive any effect to follow from any cause, and indeed any event to follow upon another ... There is no

demonstration, therefore, for any conjunction of cause and effect. And this is a principle which is generally allowed by philosophers. (Hume 1938, A 11)
 When a demonstration convinces me of any proposition, it not only makes me conceive the proposition, but also makes me sensible that it is impossible to conceive anything contrary. What is demonstratively false implies a contradiction; and what implies a contradiction cannot be conceived. But with regard to any matter of fact, however strong the proof may be from experience, I can always conceive the contrary, though I cannot always believe it. (Hume 1938, A 17)

Hume's above argument can be reconstructed as follows:

- (5a) What Hume calls "demonstration" is just a logically valid argument: if its premises are true, then its conclusion must be true; it is not the case that its premises are true but its conclusion is false. Otherwise, it will lead to a logical contradiction.
- (5b) According to Hume, the minimum condition for conceivability is without logical contradiction. So the conceivability in his CP is a logical one. A proposition is conceivable if it implies no contradiction. A proposition is inconceivable if it implies a contradiction.
- (5c) CP: whatever is conceivable is possible.

According to (5b), CP can only be understood in its logical sense: whatever is logically conceivable is logically possible. There is no evidence to show that CP could be understood in its metaphysical sense: whatever is logically conceivable is metaphysically possible.

- (5d) According to Hume, it is conceivable without contradiction that in a causal inference a cause occurs but its effect does not follow.

Both cause and effect are "states of affairs" or "events" which could be described by propositions. In a causal inference, the proposition describing a cause is regarded as its premise, and, correspondingly, the proposition describing its effect is regarded as its conclusion. Thus, (5d) means that, in a causal inference, it is logically possible that its premise is true while its conclusion is false.

- (5e) Hume argues that the validity of causal inference also relies on the universal law of causation and the principle of the uniformity of nature. But they are not logically demonstrated.
- (5f) Therefore, all causal inferences are not logically valid: "no inference from cause to effect amounts to a demonstration." (Hume 1938, A 11)

It should be admitted that the argument above is logically correct, and it decisively shows that all causal inferences are not logically valid, for it is logically conceivable that in a causal inference, a cause occurs but its effect does not follow; that is, it is logically conceivable that the proposition describing a cause

is true but the proposition describing the relevant effect is false. Since logical conceivability implies logical possibility, it is logically possible that in causal inference its premise is true while its conclusion is false; and it is impossible for any logically valid inference that its premise is true while its conclusion is false. Therefore, all forms of causal inference are not logically valid.

6 Hume's Search for the Basis of Factual Truth by Appealing to CP

Hume points out,

The contrary of every matter of fact is still possible; because it can never imply a contradiction, and is conceived by the mind with the same facility and distinctness, as if ever so conformable to reality. That the sun will not rise tomorrow is no less intelligible a proposition, and implies no more contradiction, than the affirmation, that it will rise. We should in vain, therefore, attempt to demonstrate its falsehood. Were it demonstratively false, it would imply a contradiction, and could never be distinctly conceived by the mind. (Hume 2000, EHU 4.2)

We will appeal to semantic ascend, and replace the talk about “matters of fact” with that about propositions that describe “matters of fact.” Let p be a proposition that describes a particular matter of fact (e.g. the sun will rise tomorrow), and $\neg p$ be the negation of p (e.g. it is not the case that the sun will rise tomorrow). Hume's obscure argument can be explicitly reconstructed as follows.

Argument 1

- (6a) The proposition p is conceivable without contradiction;
- (6b) CP: whatever is conceivable is possible;
- (6c) Thus, p is logically possible.
- (6d) Thus, $\neg p$ is not logically necessary.
- (6e) Therefore, it is not provable, only by logic or reason, that p is false.

Argument 2

- (6f) The proposition $\neg p$ is conceivable without contradiction;
- (6g) CP: whatever is conceivable is possible;
- (6h) Thus, $\neg p$ is logically possible.
- (6i) Thus, p is not logically necessary.
- (6j) Therefore, it is not provable, only by logic or reason, that p is true.

Combining Argument 1 and 2, we can reach the conclusion: “there is an evident absurdity in pretending to demonstrate a matter of fact, or to prove it by any arguments a priori. Nothing is demonstrable, unless the contrary implies a contradiction” (Hume 1935, DNR 9.5). Thus,

(6k) It is not provable, only by logic or reason, that p is true, and that p is false.

Obviously, Hume's above argument is logically sound. As Hume asserts, concerning the truth or falsity of our assertions about matters of fact, we must look for their basis beyond logic or reason, and look for their evidence in sensory experience about the actual world.

7 Hume's Challenge to the Existence of External Things by Appealing to CP

Hume stresses CP as a metaphysical axiom in many places: "Whatever we conceive is possible, at least in a metaphysical sense." He constructs an argument that the possible existence of one thing or event can be inferred from the mere conceivability of its existence. For example, in *Dialogues Concerning Natural Religion*, he says:

Nothing, that is distinctly conceivable, implies a contradiction. Whatever we conceive as existent, we can also conceive as non-existent. There is no being, therefore, whose non-existence implies a contradiction. Consequently there is no being, whose existence is demonstrable. I propose this argument as entirely decisive, and am willing to rest the whole controversy upon it. (Hume 1935, DNR 9.5).

By means of this kind of argument, Hume refutes the necessary existence of God:

It will still be possible for us, at any time, to conceive the nonexistence of what we formerly conceived to exist; nor can the mind ever lie under a necessity of supposing any object to remain always in being; in the same manner as we lie under a necessity of always conceiving twice two to be four. The words, therefore, *necessary existence*, have no meaning; or, which is the same thing, none that is consistent. (Hume 1935, DNR 9.6)

He further rejects the proofs of the existence of God. Thus, he finally arrives at the skeptical conclusion: the existence of God is neither verifiable nor falsifiable by logic or reason.

In Hume's works, the minimum condition for conceivability is without logical contradiction: whatever involves a logical contradiction is really inconceivable, so its existence is metaphysically impossible. Thus, the metaphysical version of ICP (i.e. whatever is inconceivable is metaphysically impossible) obviously holds. In fact, other versions of ICP, such as the physical and the epistemic versions, etc., also hold, because logical impossibility entails the impossibility of any other kind. But, from logical conceivability of the existence of an object x , it is not derivable, in any case, that the existence of x is metaphysically possible, as long as metaphysical possibility is stronger than logical one; neither is it derivable whether or not x metaphysically or physically exists. Generally, however metaphysical possibility is defined, it is stronger than logical one. As Gendler and Hawthorne writes,

On the characterizations we offered, then, it would appear that metaphysical possibility is more expansive than nomological possibility, less expansive than narrow logic possibility: it is possible in none of the senses that something is both red and not red, logically but not metaphysically possible that something is both red and non-extended, metaphysically but not physically possible that something travel faster than the speed of light, and possible in all the three senses that something travel faster than the space shuttle. (Gendler and Hawthorne 2002, 5)

Thus, in our view, Hume's metaphysical version of CP is incorrect. Metaphysical possibility of existence is not derivable from logic conceivability, no matter how many tricks Hume plays in interpreting them.

8 Conceivability Argument and Iterative Doubts

Hume clearly articulates CP and applies it in at least five arguments shown above, among which two of them are legitimate and valid: one is to show that causal inference is not logically necessary; the other is to show that the truth or falsity of propositions about matters of fact is not provable only by means of logic and reason. However, his application of CP to challenge the necessity of causal relation, the uniformity of nature, and the existence of objects is not successful. Hume fails to show that causal relation is not metaphysically or physically necessary, given metaphysical or physical necessity is stronger than the logical one. He neither proves that the principle of the uniformity of nature does not hold, nor provides a decisive demonstration about the existence or non-existence of objects.

In Hume's mind, the concept "necessity" is only 'logical necessity' or "necessity by reason." Such concept leads him to successfully demonstrate that, causal inference is not necessary, since, in such kind of inferences, truth is not preserved in the pass from its premise to its conclusion; any proposition about matters of fact is not necessarily true or false if necessity is understood in the logical sense. But, the concept "necessity" in his mind also makes him completely misunderstand the causal relation whose necessity is rooted in the actual world. He ascribes metaphysical or physical necessity to two elements: constant conjunction, and habitual association between phenomena. He even brings metaphysical or physical necessity entirely into human mind or the subjective world of humans:

Upon the whole, necessity is something, that exists in the mind, not in objects; nor is it possible for us ever to form the most distant idea of it, considered as a quality in bodies. Either we have no idea of necessity, or necessity is nothing but that determination of the thought to pass from causes to effects, and from effects to causes, according to their experienced union. (Hume 1975, T 1.3.14.22)

We agree with Don Garrett's comments,

Causal necessity is often conflated with absolute necessity in Hume's view, but it is in fact a weaker kind of necessity, amounting not to the absolute unthinkability of the cause without its effect but rather in the psychological difficulty of separating their ideas following experience of their constant conjunction, together with a psychological inability to believe them to be separated. (Garrett 2008, 54)

Thus, if there is a sharp distinction between logical and metaphysical possibilities, then Hume's conceivability argument does not hold generally. On one hand, supposing Hume's conceivability is just a logical one, if his arguments are sound, then their conclusions are trivial, since they only show that causal relation, the principle of the uniformity of nature, the truth or falsity of a proposition about matters of fact, and the existence of a concrete object, are not logically necessary; but nobody says that they are logically necessary. On the other hand, if these arguments are substantive, that is, they are concerned with other kinds of necessity than the logical one, then they are incorrect. Hume has to revise his conception of necessity or to introduce stronger kind of necessity than the logical one.

However, we also claim that, if Hume's conceivability argument were successfully applied, it would be necessary for him to make no sharp distinction between different levels of modalities. That is, at least for Hume, there should be no *prima facie* (but only by degree) distinction between levels of modalities. In fact, Hume only makes use of the conceivability argument in the critical or negative sense rather than the constructive or positive one. The passage below shows how Hume uses skeptical reasoning in his argument:

Having thus found in every probability, beside the original uncertainty inherent in the subject, a new uncertainty deriv'd from the weakness of that faculty, which judges, and having adjusted these two together, we are oblig'd by our reason to add a new doubt deriv'd from the possibility of error in the estimation we make of the truth and fidelity of our faculties. This is a doubt, which immediately occurs to us, and of which, if we wou'd closely pursue our reason, we cannot avoid giving a decision. But this decision, tho' it shou'd be favourable to our preceeding judgment, being founded only on probability, must weaken still further our first evidence, and must itself be weaken'd by a fourth doubt of the same kind, and so on in infinitum; till at last there remain nothing of the original probability, however great we may suppose it to have been, and however small the diminution by every new uncertainty. No finite object can subsist under a decrease repeated in infinitum; and even the vastest quantity, which can enter into human imagination, must in this manner be reduc'd to nothing. Let our first belief be never so strong, it must infallibly perish by passing thro' so many new examinations, of which each diminishes somewhat of its force and vigour. When I reflect on the natural fallibility of my judgment, I have less confidence in my opinions, than when I only consider the objects concerning which I reason; and when I proceed still farther, to turn the scrutiny against every successive estimation I make of my faculties, all the rules of logic require a continual diminution, and at last a total extinction of belief and evidence. (Hume 1975, T 1.4.1.6)

That is, a doubt can be iterated: any judgment can be doubted, no matter what its probability is; and the doubt itself can also be further doubted. The skeptical process is one where presuppositions and premises are revealed endlessly. For example, when one considers whether a judgment p is plausible, she unearths its premise q , another judgment, upon which p relies. The plausibility of q can be further challenged by revealing its premise, say a new judgment r . Since there are always new premises added, the uncertainty of the original proposition increases, and its probability is reduced. We call doubts in this iterative process first-order doubt, second-order doubt, third-order doubt and so on. According to Hume, the probability or belief degree of our original judgment will be reduced to nothing after the process of iterative doubts, since we gradually recognize the fallibility of our own cognitive ability. In our view, the skeptical reasoning in the iterative process is non-monotonic. For example, a medical doctor makes a decision about a diagnosis of cancer for a patient, but his decision should presuppose that she is medically competent to make such a decision, which is further conditioned on whether she is well educated and trained in medical school. Due to the weakness of ability and possibility of error, anyone will unavoidably fall into the cognitive state of self-doubts and iterative doubts; then she not only undermines her original belief but also undercuts the undermining ground itself. Such a skeptical process is a non-monotonic reasoning in which the addition of new premises will challenge or reduce the belief degree of conclusions which would be derivable without these new premises.

Could there be any stop or interrupt in the skeptical process? Hume's answer is "no": "all the rules of logic require a continual diminution, and at last a total extinction of belief and evidence" (Hume 1975, T 1.4.1.6). If one could stop somewhere in the skeptical reasoning, this means that she has found out an equilibrium when evaluating the changing of premises and conclusions, or that she has kept an balance, in the non-monotonic reasoning, between the addition of new premises and the reduced probability of conclusions. In other words, the skeptical process can only be stopped by something undoubtable. If not sense but reason is considered here (since Hume talks about the above skeptical reasoning under the title of "Of Scepticism with Regard to Reason"), then what is undoubtable can be formulated as an (logical, mathematical, metaphysical or physical) axiom with necessity; that is, one stops somewhere in the skeptical reasoning because she hits on an unchallengeable and unshakable axiom of certain necessity. But what is necessity? Without a clear conception of necessity, no one is entitled to posit any axiom as a necessary truth. It is here that the interdependence between possibility and necessity will lead to a circle. On one hand, if one has a clear conception of necessity, then the scope of possibilities must be fixed, and iterative doubts should be terminated; only when possibilities are restricted in a certain area, necessities could be well established. On the other hand, if there is no clear conception of necessity, then any possibility becomes indefinitely extensible; only a certain kind of necessity could limit the scope of possibility arising from the skeptical reasoning process. However, if there is no fixed point in the dynamic process of non-monotonic reasoning, then such a circular chain is unsolvable. This is in fact what Hume's iterative skepticism as an infinite regress argument leads to.

Furthermore, if Hume's conceivability argument is used in the context of skeptical reasoning, then there is no distinction between levels of modalities. We argue that if there is such a distinction, then it will lead to a circle similar to that caused by the above interdependence between possibility and necessity. On one hand, according to our axiomatic characterization of necessity, if one has a clear conception about levels of necessities (logical, mathematical, metaphysical and physical), then she has a sharp distinction between logical and non-logical axioms (between mathematical and non-mathematical, metaphysical and non-metaphysical, physical and non-physical). Different kinds of axioms set the limits of different kinds of conceivability. For example, if a proposition is mathematically conceivable, that is, it involves no contradiction with mathematical axioms, then it is mathematically possible. On the other hand, in the skeptical reasoning, there are always new information to be introduced and new premises to be added, and one has to realize that what she actually knows or believes is only the tip of the iceberg; a large amount of evidence and presuppositions are to be revealed. That is, in the dynamical process of self-doubt and belief revision, the lines between different kinds of axioms become blurred. For example, if it is logically conceivable that a mathematical axiom becomes non-mathematical, or that a non-mathematical axiom becomes mathematical, then it is logically possible. That is, the mathematical or non-mathematical status of such axiom is challengeable. Further, there is no sharp boundary between mathematical and physical axioms. In some passage, Hume also argues that even mathematical propositions are no more privileged than physical ones:

There is no Algebraist nor Mathematician so expert in his science, as to place entire confidence in any truth immediately upon his discovery of it, or regard it as any thing, but a mere probability. Every time he runs over his proofs, his confidence encreases; but still more by the approbation of his friends; and is rais'd to its utmost perfection by the universal assent and applauses of the learned world. Now'tis evident, that this gradual encrease of assurance is nothing but the addition of new probabilities, and is deriv'd from the constant union of causes and effects, according to past experience and observation. (Hume 1975, T 1.4.1.2)

In conclusion, we have argued: (1) if there is a distinction between levels of modalities, then Hume's application of conceivability argument will not hold. We also argued: (2) if Hume's application of conceivability argument holds, then there will be no distinction between levels of modalities. Although (1) and (2) are logically equivalent, they are argued in different ways. For (1), we begin with an axiomatic characterization of modality, and proceed to check Hume's arguments in detail by the distinction between logical and metaphysical possibilities. For (2), we start from Hume's skeptical reasoning, and show that any distinction of modalities will lead to a circle. Thus, we establish a certain connection, in Hume's philosophy, between varieties of modalities and conceivability arguments.

9 Further Remarks

In order to escape some of Hume's predicaments, we have to revise his conception of necessity, that is, to adopt stronger kind of necessity than logical one. In fact, this is what happens in the history of logic and philosophy after Hume.

- (1) The reformulation of logical necessity: with respect to the class of models

Hume has a narrow conception of logic as an exact science of deduction. Since, in his time, the formalization and systematization of logic were not highly developed, his knowledge of logic is very limited, and his understanding of logical necessity as an absolute one is reasonable but problematic. Today, with the development of non-classical logics or philosophical logics, especially with the application of possible-world semantics, the truth or falsity of a logical formula is defined with respect to a particular model, and logical truths are defined to the class of such models, so are the concepts of logical necessity and possibility (cf. Chen Bo, 2005, 83).

Basics: true in one possible world of a model;

Levels of validity

$$\left. \begin{array}{l} \text{Weak validity in a model} \rightarrow \text{weak validity in a class of models} \\ \text{Validity in a model} \rightarrow \text{validity in a class of models} \\ \text{Validity in a frame} \rightarrow \text{validity in a class of frames} \\ \text{Universal validity: true in any class of frames} \end{array} \right\}$$

levels of logical truth

That is to say, even the concepts of logical necessity and possibility are not absolute ones, and become relative concepts with respect to the classes of model and frame, let alone the concepts of metaphysical and physical ones.

- (2) Acceptance of metaphysical or physical necessity: Kant's synthesis a priori judgment

Hume constantly questions the necessity of causal relations, the uniformity of nature, and the certainty of empirical knowledge by limiting his understanding of "necessity" solely to "logical necessity." As contemporary natural sciences have made great achievements, it would not only be silly, pedantic, and bigoted, but also be lying to everyone's face, if we stuck to Hume's standpoint to deny the truthfulness, generality, and necessity of natural science knowledge by claiming that we could not prove them to possess such kind of characteristics. By abandoning Hume's biases and prejudice, Kant does not doubt the generality and necessity of natural science knowledge anymore; he takes them as granted instead by asking: how is a synthesis a priori judgment possible? In other words, how is the general and necessary knowledge of natural science possible? He places this problem as the epicenter of his philosophy and develops a brand new philosophical theory combining experience and reason, thus initiates "the Copernicus Revolution" in modern philosophy.

If Kant took everything in Hume's philosophy as correct, there would never be his glorious philosophy.

It is correct and straightforward that the history of philosophy is the history of academic and ideological killing-fathers. Latecomers abandon certain premises, pre-suppositions, and basic assumptions of their predecessors, put aside the problems they had voted their hearts to study, and even turn over the whole table they set up. They start a new phase of development of human thought, and propose many new philosophical thoughts and doctrines to be critically examined by their followers.

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