THEORIA

Kripke's Gödel case:
Descriptive ambiguity and its experimental interpretation

(El caso Gödel de Kripke: ambigüedad descriptiva y su interpretación experimental)

Chao DING*
Tsinghua University

Chuang LIU
Fudan University

ABSTRACT: Kripke has taken the Gödel case as a counterexample for reference descriptivism. Machery *et al.* question the validity of Kripke's case and had conducted empirical studies to show its inadequacy. Experimental data suggest intuitions on this matter vary both across and within cultures. However, there is a descriptive ambiguity, we argue, in Kripke's Gödel case, for people associate different types of descriptions with proper names, such as the description of brute facts and the description of social facts. We argue in this paper with experimental data that the descriptive ambiguity exists and affects the actual ratio of Kripkeans in reference. This result flaws Machery *et al.*'s interpretation on empirical research, but does not challenge their claim on cross-cultural divergence. In fact, there are more East Asian descriptivists than Machery *et al.* expected.

KEYWORDS: semantic intuitions, proper names, reference, social fact, Gödel case, Kripke.

RESUMEN: Kripke toma el caso Gödel como un contraejemplo a las teorías descriptivistas de la referencia. Machery et al. *cuestionan la validez del caso presentado por Kripke, y han llevado a cabo estudios empíricos para mostrar su inadecuación. Los resultados experimentales sugieren que las intuiciones sobre estas cuestiones varían tanto entre culturas como dentro de ellas. Sin embargo, sostenemos que existe una ambigüedad descriptiva en el caso Gödel de Kripke, ya que los sujetos asocian distintos tipos de descripciones a los nombres propios, por ejemplo, descripciones de hechos brutos y descripciones de hechos sociales. En este artículo defendemos con datos experimentales que dicha ambigüedad descriptiva existe y afecta a la proporción de kripkeanos sobre la referencia. Este resultado socava la interpretación de los resultados empíricos realizada por Machery* et al., *aunque no cuestiona su tesis sobre divergencias entre culturas. De hecho, hay más descriptivistas entre asiáticos orientales de lo esperado por Machery* et al.

PALABRAS CLAVE: intuiciones semánticas, nombres propios, referencia, hechos sociales, aaso Gödel, Kripke.

1. Introduction

In philosophy, enlightened intuitions play the role of experimental results in science. Kripke (1972/1980), in his now famous study, offers hypothetical cases to elicit people's semantic intuitions of reference. The Gödel case is one of the cases that Kripke uses to show how intuition goes against reference descriptivism in favor of the Kripkean intuition about proper names. Machery, Mallon, Nichols, and Stich (2004) question the validity of such intuitions in light of currently discovered cognitive differences across cultures. Machery *et al.* adapted a series of questionnaires from Kripke's original scenario and conducted surveys to collect experimental data on ordinary people's referential intuitions. Their data suggest that while Westerners tend to have Kripkean intuitions, most East Asians tend to have descriptivist intuitions. They therefore argue in general against the methodology of using intuitions as evidence in deciding on philosophical issues.

We critically examine in this paper Kripke's original premise in the Gödel case as well as Machery *et al.*'s subsequent handling of it. Our results indicate that an important aspect of descriptive meaning is missed in the discussion. There are two typical descriptions in the Gödel case, instead of only one, as Kripke supposes. Descriptivists who accepted a description of a social fact were miscounted as Kripkeans in Machery *et al.*'s and subsequent researchers' experimental results.

In the rest of the current section, we review the premise that people associate only one description with the proper name "Gödel" in Kripke's Gödel case and the premise that connects *prima facie* intuitions with theories of reference in Machery *et al.*'s experimental interpretation. In Section 2, we address the descriptive ambiguity in Kripke's Gödel case and argue that the description of the social fact does not conflict with the non-circularity condition. In Section 3, we present experimental data to show the existence of the descriptive ambiguity and conduct a disambiguated experiment along with a replication of Machery *et al.*'s original experiment in simplified Chinese as a control. Finally, in Section 4, we speculate on the origins of the descriptive ambiguity and the validity of using intuitions and reasons in experimental interpretations.

1.1. KRIPKE'S GÖDEL CASE

As the strongest case for his rigid designator theory of semantics, Kripke (1972/1980) argues that the reference of a proper name is fixed by a causal-historical chain connecting the name and its referent independent of any descriptions of the referred individual. Kripke's argument centers on the fact that it often happens that competent speakers associate a description D with a proper name N, while an object O uniquely satisfies D; however, competent speakers causally and historically refer N to the object O', even though D is not true of O'. Kripke argues that our intuition about the reference of proper names tells us that O' is the referent of N, not O.

In Kripke's Gödel case, Kripke supposes competent speakers believe Gödel is the person who discovered the incompleteness of arithmetic, which is the only thing people know about Gödel; however, Schmidt, actually did this work, unbeknownst to anyone. Therefore, when people use the name "Gödel", they refer to Gödel, who does not satisfy the only description. Thus, Kripke claims the Gödel case has falsified reference descriptivism. We should note that the condition "that's practically the only thing many people have heard

about him-that he discovered the incompleteness of arithmetic" (Kripke, 1972/1980, pp. 83) is crucial in Kripke's argument. We take this as P1 for later discussion.

P1   People can associate only one description with the proper name "Gödel", namely, "the person who discovered the incompleteness of arithmetic".

The premise can be relaxed to include more than one simple description as long as the descriptions form a group of propositions that are about a single aspect of the individual in question which is generally known to the populace as a single unit and these descriptions are false. It would not work if people associate a cluster of descriptions with a proper name, while only some of the descriptions are not true about the individual. In that case, we should regard these descriptions as simply mistaken and having no bearing on the issue of reference descriptivism. This is why some descriptivists claim that there is no need for the referent to satisfy all the descriptions but to satisfy most of them (Searle 1958). Our relaxation is permitted when we consider Kripke's emphasis that even if someone might use other descriptions in Kripke's Gödel case, e. g. "the man who published the manuscript", we can still change the scenario a little to maintain the description as that in P1 (Kripke, 1972/1980, pp. 84).

1.2. Machery *et al.*'s experimental study

Machery *et al.* (2004) launch a major challenge to Kripke's Gödel case in experimental philosophy by questioning the universal validity of intuitions within and across cultures. They adapted a series of questionnaires to test ordinary people's referential intuitions.

> [Suppose that John has learned in college that Gödel is the man who proved an important mathematical theorem, called the incompleteness of arithmetic. John is quite good at mathematics and he can give an accurate statement of the incompleteness theorem, which he attributes to Gödel as the discoverer. But this is the only thing that he has heard about Gödel. Now suppose that Gödel was not the author of this theorem. A man called "Schmidt", whose body was found in Vienna under mysterious circumstances many years ago, actually did the work in question. His friend Gödel somehow got hold of the manuscript and claimed credit for the work, which was thereafter attributed to Gödel. Thus, he was been known as the man who proved the incompleteness of arithmetic. Most people who have heard the name "Gödel" are like John; the claim that Gödel discovered the incompleteness theorem is the only thing they have ever heard about Gödel. When John uses the name "Gödel", is he talking about:
>
> (A) the person who really discovered the incompleteness of arithmetic? or
> (B) the person who got hold of the manuscript and claimed credit for the work?]. (Machery *et al.*, 2004, pp. B6)

Machery and subsequent researchers who replicated or revised Machery *et al.*'s original study have all adhered to P1 in Kripke's original Gödel case, and therefore, these investigations can be regarded as a crucial experiment for testing whether ordinary people have descriptivist intuitions or Kripkean intuitions. However, there is another premise (perhaps auxiliary) in Machery *et al.* study, P2.

P2   Anyone that chooses (A) "the person who really discovered the incompleteness of arithmetic" has descriptivist intuitions, whereas anyone that chooses (B) "the per-

son who is widely believed to have discovered the incompleteness of arithmetic" has Kripkean intuitions.[1]

Based on P2, an operationalization of the tested hypotheses, Machery *et al.* (2004) interpret their experimental results as that East Asians tend to have descriptivist intuitions, while Westerners tend to have Kripkean intuitions; as a result, they conclude that people's intuitions are not reliable in philosophical inquiries. This conclusion is supported by a series of replicated and revised studies (Machery *et al.,* 2009, 2010, 2012, 2015), challenging the traditional methodology.

1.3. Criticisms

Before introducing the descriptive ambiguity in Kripke's Gödel case, we want to briefly review some of the recent literature on experimental philosophy in general, and on experimental philosophy of language in particular. Our aim in this section is to show that there's room for the kind of experimental approach we want to pursue in this paper.

Deutsch's (2010) challenge to the methodology of experimental philosophy is that philosophical arguments depend on the genuineness of certain counterexamples, while experimental philosophers mistake it as intuitiveness. Thus, opinion polls provided by experimental philosophy cannot serve as empirical evidence for philosophical arguments. Likewise, Domaneschi and Vignolo contend that it is the integrated explanation of linguistic usage that helps to construct theories of reference, not merely the raw results of the experiments on folk people (Vignolo and Domaneschi 2018, Domaneschi and Vignolo 2020). Cappelen poses a more radical criticism of the use of intuitions and the method of cases in philosophy. Cappelen claims that contemporary analytic philosophers do not rely on intuitions as evidence and the irresponsible use of intuition "has fundamentally misled metaphilosophers" (Cappelen 2012, 1). He emphasizes that evidence for or against a philosophical theory is based on the competence and comprehension of concepts involved in philosophical questions.

Martí (2009) argues that in order to test people's referential intuitions, experimental philosophers should reveal how people use names, not merely how people mention them in a metalinguistic sense. Machery, Olivola, and de Blanc (2009, henceforth MOD) maintain that truth-value judgment experiments test usage. Martí (2012) disagrees, but Devitt and Porot (2018) further defend the idea that testing truth-value judgments amounts to testing usage. MOD conduct truth-value surveys in comparison with the original ones and find no significant difference between them, which shows cross-cultural divergence still exists (Machery *et al.,* 2009). However, Vignolo and Domaneschi (2018) indicate the conceptual limitation in Machery *et al.*'s survey and conduct a set of sophisticated experiments, resulting in a different conclusion. This brief survey of the recent literature suggests that there is no conclusive reason against testing laypeople's referential intuitions to determine whether a certain theory is true.

Sytsma and Livengood (2011) indicate the perspective ambiguity in the probe questions, which is the ambiguity of the speaker's reference, namely, whom John intends to refer to, and semantic reference, namely, to whom the name "Gödel" literally refers. Sytsma and Livengood also provide experimental data to show the existence and impact of this

---

[1] Choice (B) is adapted from Machery (2012).

ambiguity. Machery (2015) admits this ambiguity exists but refutes its effect on the divergence of intuitions. Machery conducts a series of clarification experiments to isolate this ambiguity and minimize its impact. The results suggest that although the perspective ambiguity exists, referential intuitions still vary across and within cultures. While Sytsma *et al.* (2018) agree with Machery's claim, Domaneschi and his colleagues find people tend to judge from different perspectives on different cases (Domaneschi *et al.,* 2017).

Sosa (2007) observes that it is likely that the supposed divergence of intuitions is in fact a verbal divergence. He points out that the experimental results are only associated directly with people's *prima facie* responses to certain words in specific cases so the differences in participants' understanding have no substantive philosophical significance. Sosa urges experimental philosophers to rule out potential verbal divergence before drawing philosophical conclusions. As strong evidence for verbal divergence, though not in the Gödel case, Sosa points to Shaun Nichols and Joseph Ulatowski's (2007) empirical study on the Knobe effect. The study suggests that part of the explanation for the Knobe effect is people's different interpretations of the term "intentional", instead of the original explanation that it depends on the side effect brought about by a certain action.

The verbal ambiguity, as also shown in Kripke's Gödel case, is perhaps the most intensively discussed ambiguity in experimental philosophy (see, Ludwig 2007, Deutsch 2009, 2010, Sytsma & Livengood 2011, Ichikawa 2012, Sytsma *et al.* 2015, Heck 2018). For example, Izumi, Kasaki, Zhou, and Oda (2018, henceforth IKZO) address the noun phrase ambiguity, which indicates that bare noun phrases (without articles) in Chinese and Japanese[2] admit of multiple interpretations that are different from definite descriptions in English. IKZO also conducted disambiguation experiments on native Japanese speakers to show the existence of the noun phrase ambiguity.

For the rest of our paper, we explore another more important type of ambiguity and conduct experiments to investigate the case.

2. The Descriptive Ambiguity in Kripke's Gödel case

2.1. TWO DIFFERENT DESCRIPTIONS

Philosophers take for granted that

D0: The person who discovered the incompleteness of arithmetic

means

D1: The person who *actually* discovered the incompleteness of arithmetic,

even though the information that validates the description might not be easy to come by (e.g. Gödel being a reclusive person whom few people knew well in person). But D0 is vague. D0 can also be interpreted as

D2: The person who is *widely believed* to have discovered the incompleteness of arithmetic.

---

[2] Chinese and Japanese usually have no articles in noun phrases or sentences.

D2 in fact appears in Machery *et al.* (2004, pp. B6), as the conclusion of one of the arguments.

1. John has learned in college that Gödel is the man who proved an important mathematical theorem.
2. Most people who have heard the name "Gödel" are like John.

Conclusion: Gödel is the person who is widely believed to have discovered the incompleteness of arithmetic.

We now argue that P1 as a premise in Kripke's Gödel case argument is undermined by the descriptive ambiguity, of which the above is an example. While D1 is a description based on the brute fact that Schmidt actually discovered the theorem, D2 is based on the social fact (or psychological fact) that Gödel is widely believed to have discovered the theorem. It is reasonable to interpret D0 as D2 because D2 describes a fact and points to an individual exclusively as its referent. We believe that when full and accurate information is not readily available, descriptions like D0 can typically mean D1 or D2. Philosophers may regard this ambiguity as the result of confusion, but in real life, in a real population of language users, you can find some people understand D0 as D1 straightforwardly, while some other people regard D0 as saying D2 straightforwardly. The first sort of people may be more sensitive to the lack of information about Gödel than the second sort of people (who perhaps think there really is no difference between what is widely held to be true and what is in fact true whether the information is sufficient to warrant a widely held belief). Therefore, we argue that it is the wrong attribution of description D1, not reference descriptivism, that fails in the Kripke Gödel case.

In terms of reference, both D1 and D2 can be counted as descriptivist references. Thus, Machery *et al.*'s probe questions cannot distinguish whether participants have descriptivist intuitions or Kripkean intuitions. For example, "(A) The person who is widely believed to have discovered the solstice times, but actually stole this discovery and claimed credit for it? (B) The person who (unbeknownst to Ivy) really determined the solstice times?" (Machery 2012, pp. 46) is inappropriate to investigate people's real referential intuitions, for both choices are descriptions, and neither of them shows a causal-historical chain as the Kripkeans demand. It is possible that a descriptivist associates D2 with the name "Gödel" and chooses (A) in the questionnaire, but Machery *et al.* miscount this descriptivist as a Kripkean. Thus, in Machery *et al.*'s experiments, choice (A) is not sufficient to be a Kripkean, while choice (B) is not necessarily for a descriptivist. Therefore, premise P2 is undermined; Machery *et al.*'s experiments are not crucial experiments to judge between theories of reference.

The descriptive ambiguity cannot be eliminated by a change of verbal expressions. Even though Machery *et al.* take some other descriptions to denote the man named "Gödel" in the scenario, e.g., "the person who got hold of the manuscript and claimed credit for the work" (Machery *et al.* 2004, pp. B6), the referent of these descriptions remains the same as D2. Furthermore, suppose we add the information that "Schmidt is a German, whereas Gödel is an Austrian" in the scenario, and use the choices "(A) the German; (B) the Austrian" in the probe question. The meaning of these choices changes, but this change of meaning does not affect the reference relation. Descriptivists who accept D2 can still make the same choice to denote the individual whom they believe the name "Gödel" should refer to. It should be obvious that our focus, as well as that of Machery

et al.'s original study, is reference descriptivism, not meaning descriptivism (Machery *et al.* 2015, note 5). Hence, all the different descriptions Machery *et al.* use to denote the man named "Gödel" in the scenario are equivalent to D2.

Based on the argument above, we propose a study of the following two hypotheses

— Hypothesis 1: There are two typical descriptions people can associate with the proper name "Gödel". One describes the fact that most people believe Gödel proved the theorem in question, and the other describes (says) simply that Gödel proved the theorem. People are more inclined to accept the former than the latter due to the lack of information.
— Hypothesis 2: If disambiguated, the real proportion of Kripkean is lower than that in Machery *et al.*'s original study.

The reason we believe H2 is true is that we believe descriptivists who accept the social fact were miscounted as Kripkeans in their original study.

2.2. Response to noncircularity condition and causal connections

In the original case, Kripke demands that a noncircularity condition be applied to the testing of any adequate theory of reference, as "for any successful theory, the account must not be circular. The properties which are used in the vote must not themselves involve the notion of reference in a way that it is ultimately impossible to eliminate" (Kripke, 1972/1980, pp. 68). Kripke argues that a violation of the noncircularity condition leads to a failure of any independent determination of reference. For example, the proposition, "I use the name 'Gödel' to refer to the man that I call 'Gödel'" is an apparent circular statement that fails to determine the reference.

There might be a worry then that the social fact that we proposed in D2 should be regarded as circular in Kripke's sense, for Kripke did argue something to the effect that a statement such as "Gödel is the person who is widely believed to have discovered the incompleteness of arithmetic" or "Gödel is the man to whom the incompleteness of arithmetic is commonly attributed" is a circular statement. And because it is circular, no one can use it to actually find out what the real referent of the name "Gödel" is and figure out any properties Gödel possesses.

We argue that the circularity charge does not apply to our case, such as D2, which has an independent descriptive meaning from D1 for D0. Indeed, such statements as "we use the name 'Gödel' to refer to the man that we call 'Gödel'" and "we attribute this achievement to the man to whom we attribute it" are circular; but a statement as this, "we use the name 'Gödel' to refer to the man to whom the achievement is commonly attributed" are not. The statement contains two different verbs ("refer to" and "attribute to"), involving two different kinds of judgment (reference and attribution).

Another worry about the validity of D2 is that it may involve potential causal connections, especially about how people are acquainted with the individual/object that they cannot verify independently, which would make D2 a hybrid attitude of Kripkean and descriptivists. For example, in Kripke's Gödel case, the first person in the historical chain believed that "Gödel", instead of "Schmidt", discovered the theorem and this misunderstanding worked as an act of dubbing. Subsequent speakers borrowed the name through chains of communication, making Gödel the widely believed discoverer of the theorem. In this

case, the causal-historical link plays a role in D2. In response to this point, we defend the validity of D2 in three aspects.

First, this skeptical attitude is not against D2 exclusively, but against the descriptive theory in general. For example, descriptivists often associate "the highest mountain in the world" with Mount Everest, even though they have never seen it, nor walked around the world measuring the height of each mountain. In this sense, they learn about Mount Everest from others in the same way as D2, and so are other frequently used examples such as the morning star, Socrates, Gödel, etc. People have limited time and experience in their life and cannot verify the truth value of these descriptions independently, making most descriptions D2 type. However, although D2-type descriptions are prevailing in both real life and philosophical examples, philosophers did not take the potential causal connections as a critical disproof against the descriptive theory, or it would be unnecessary to construct so many thought experiments.

Second, the potential causal connection is not the main point to refute the descriptive theory in the Gödel case. Kripke is aware of D2 and discusses it when introducing the Gödel case in *Naming and Necessity*, but he refutes D2 because of his noncircularity condition, not the potential causal link in D2. Kripke argues that although the only description D is true of O, speakers still use the name N to refer to O'. However, if people could associate another description D', which is true of O', with O', can Kripkean still disprove the descriptive theory? No, and this is why Kripke insists we can only form one description D in the Gödel case. It is the absence of description (no description for O') or the mismatch of the description (D is not true of O') that refutes the descriptive theory.

Third, even though D2 involves causal connections, it is not likely to be the reason for the folk participants to choose D2 in our experiment. The scenario clearly mentions two individuals, the unbeknownst real discoverer and the famous fake discoverer, and the participants were asked to choose between them. This contrast is even more significant in the probe question, affected by the contrast effect in psychology, which means people consider more differences in comparisons than assessing them individually. The participants are likely to weigh which factor determines the reference (people's consensus, or the brute fact), rather than detecting the potential causal connection in one or two minutes. Moreover, we do offer choice C indicating Gödel's real and original name is "Gödel", which is an obvious and classic causal-historical chain in Kripke's sense. It is unlikely that Kripkean participants overlook the obvious causal chain but choose a potential one.

As a caveat, we want to emphasize the point that we are not attempting to establish a general normative theory about which type of description is adequate in each situation. The most crucial point is not what people should do, but what people *actually* do. At worst, people who accept the description of the social fact may lack a sense of logic, but they are still descriptivists in reference. Kripke believes ordinary people have Kripkean intuitions that we do refer to Gödel when we use the name "Gödel". Machery *et al.* doubt this belief and provide empirical evidence to show that some people have descriptivist intuitions as well. Similarly, Kripke argues there should be only one description in the Gödel case. But we provide empirical evidence in the following section to show that a majority of people do accept D2, the description of the social fact, in Kripke's Gödel case.

3. Experiments

Before we begin to present our experimental study, we feel necessary to have the following preamble about our methodology. Philosophers usually use hypothetical cases to elicit intuitions, which are commonly treated as *prima facie* evidence for settling philosophical issues. However, the construction of a hypothetical case is a complex matter; it involves special handling of auxiliary conditions, which includes the choice of language and medium, the grammar and syntax in the construction, the plot and perspective it delivers, and the value and attitude it bears, all of which affect people's intuition and judgment as we discussed in section 1.3. We believe that the intuition elicited by a hypothetical case is a *holistic* response to the philosophical issue in question; philosophical theories cannot be confirmed or falsified simply by *prima facie* intuitions *alone* in hypothetical cases. On the other hand, the interpretation of philosophical experiments is always perspective-laden and philosophers always interpret experimental results from the perspective they have special reasons to adopt. We must guard against skeptics who always can and do question conclusions drawn from experiments because of the holistic effect of the auxiliary assumptions/conditions. As Lam points out, "speakers may not be reporting to the kind of intuition a philosopher is hoping to elicit in asking a particular question"(Lam, 2010, pp. 327). The following study cannot hope to be cleared of such a skeptical point of view, and yet we believe we have made the case on the same level of rigor as the other studies, especially the study of Machery *et al.*

3.1. Study 1: the existence of the descriptive ambiguity

3.1.1. Materials

Our goal in Study 1 is to detect the existence of the descriptive ambiguity addressed above. Online anonymous simplified Chinese questionnaires were given to two groups of participants separately. Each questionnaire contains one question with two options. One option consists of the description of the brute fact; the other option consists of the description of the social fact. Questionnaire I was adapted from Kripke's original Gödel case. Since Study 1 was not aimed at the judgment between theories of reference, Schmidt did not appear in this questionnaire, so no referential intuition was tested. The English translation of Questionnaire I is given below (see Appendix A.1.1 for the original Chinese version):

> Suppose that you have learned in college that Gödel is the man who proved an important mathematical theorem, called the incompleteness of arithmetic. You are quite good at mathematics and can give an accurate statement of the incompleteness theorem. But this is the only thing that you have heard about Gödel. Most people are like you; the claim that Gödel discovered the incompleteness theorem is the only thing they have ever heard about Gödel. Do you regard Gödel as:
>
> (A) the person who really discovered the incompleteness of arithmetic? or
>
> (B) the person who is widely believed to have discovered the incompleteness of arithmetic?

Questionnaire II had the same structure as Questionnaire I, but the name and scenario are more familiar to Chinese people. We should note that Questionnaire II was adapted from a real case in Chinese history, not a hypothetical one. Some philosophers argue that intuitions elicited from real cases are more convincing than those from hypothetical cases (Deutsch 2009, 2010, Devitt 2011). Whether this argument is valid or not, we provide a real case in comparison. The English translation of Questionnaire II is given below (see Appendix A.1.2 for the original Chinese version):

> The statesman in the Northern Song Dynasty of ancient China, Shen Kuo (1031-1095), recorded in his famous ancient sketch book *Brush Talks from Dream Brook* that a folk craftsman, Bi Sheng, invented the movable type printing, which is to carve every Chinese character on a small block of clay, then arrange these blocks and print on boards. But this is the only thing that you have heard about Bi Sheng. Most people are like you; the claim that Bi Sheng invented the movable type printing is the only thing they have ever heard about Bi Sheng. Do you regard Bi Sheng as:
>
> (A) the person who really invented the movable type printing? or
> (B) the person who is widely believed to have invented the movable type printing?

3.1.2. Participants

Undergraduates from Mainland China participated. The participants were divided into two groups to answer Questionnaire I (N = 82) and Questionnaire II (N = 37) separately. All the participants were native Mandarin-speaking, ethnically Chinese speakers, and none of them majored in philosophy. Since all the participants were homogeneous, detailed demographic data were not collected.[3]

3.1.3. Results

The results are displayed in Figure 1. For Questionnaire I, 84.1 percent of the participants chose the option of widely believed discoverer other than the option of the real discoverer. For Questionnaire II, the proportion is 97.3 percent, even higher than that in the hypothetical case. The results support our hypothesis 1 that (a) there are actually two typical descriptions in Kripke's Gödel case, and (b) people are usually more inclined to choose the description of the social fact when the information about a specific individual is limited.

---

[3] We can still estimate the demographic data roughly through course register, N1 (age range: 18-22; 83% males), N2 (age range: 18-22; 73% males).
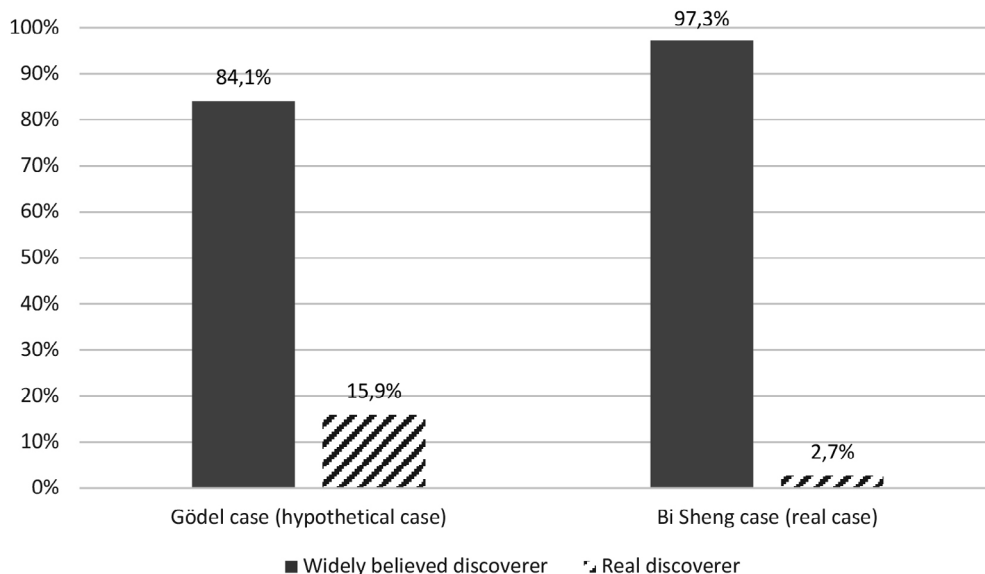
Figure 1

The existence of the descriptive ambiguity

3.2. Study 2: the replication of Machery et al.'s original study

3.2.1. Materials

Machery *et al.*'s original study was widely replicated and revised by many subsequent researchers, in Cantonese language (American Chinese participated, Lam 2010), traditional Chinese (Hong Kong people participated, Machery *et al.* 2010, 2015), and Japanese (Japanese participated, Sytsma *et al.* 2015, Izumi *et al.* 2018), to test East Asians' referential intuitions. However, no large-scale survey in simplified Chinese on Mainland Chinese, which has a population of 1.4 billion,[4] was conducted before. Study 2 is a replication of Machery *et al.*'s original study in simplified Chinese on Mainland Chinese to fill in the missing part of data from East Asia. Moreover, Study 2 is conducted as a controlled experiment for the further disambiguated experiment in Study 3. An online simplified Chinese questionnaire was given to participants. The scenario was based on Machery *et al.*'s traditional Chinese version (Machery *et al.* 2010), with only a few minor verbal revisions to make it fluent in simplified Chinese. The answer choices were randomized to avoid the potential order effect. The English version is quoted in Section 1.2 (see Appendix A.2 for the Chinese version)

---

[4] Most Chinese speak Mandarin and write in simplified Chinese, only a small part of Chinese, e.g., Hong Kong people, speak Cantonese and write in traditional Chinese.

3.2.2. Participants

Newly admitted undergraduates from Mainland China participated (N = 115, 98 males, 17 females; age range: 17-19, mean = 18). All the participants were native Mandarin-speaking, ethnically Chinese speakers, and none of them majored in philosophy. Besides the 115 competent participants, five participants were excluded because they took less than ten seconds to answer the questionnaire.[5]

3.2.3. Results

The results are displayed in Figure 2. In comparison with Machery *et al.*'s (2004) original study, which indicates 29 percent of undergraduates from the University of Hong Kong (N = 41, 16 males, 25 females) picked the *prima facie* Kripkean choice in English, our replication indicates 27.8 percent of undergraduates from Mainland China picked the same choice in simplified Chinese. There is no statistically significant difference between Machery *et al.*'s and our data through a two-tailed z-test (Z = −.277 > $Z_{0.61}$ = −.28, p = .61). This result conflicts with Lam's (2010) hypothesis that linguistic competence may account for the divergence.
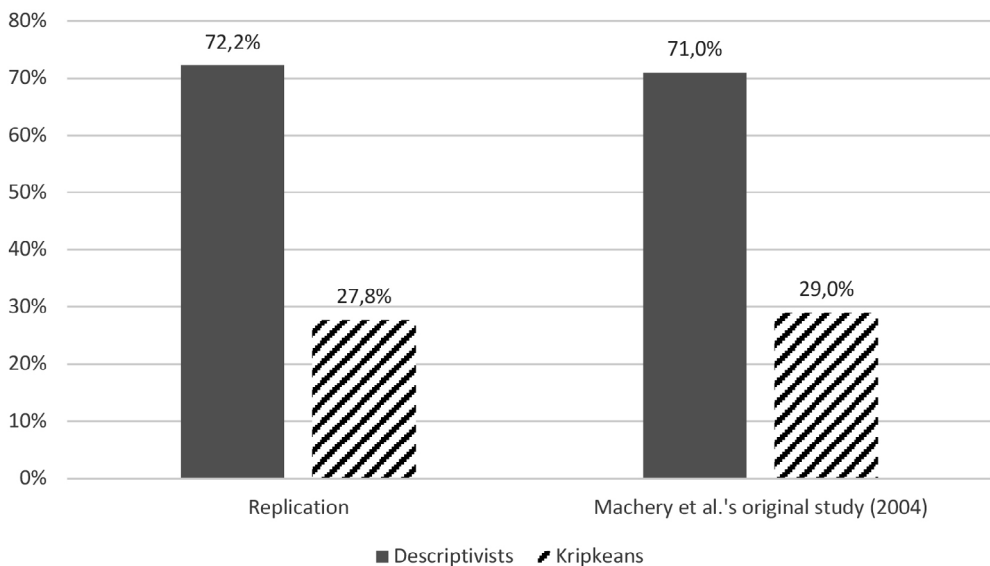
Figure 2

The simplified Chinese replication of Machery *et al.*'s original study

---

[5] 95% of the participants took 29 seconds or longer to answer the questionnaire. Short answer time, i.e. less than ten seconds, may imply the participant did not read or answer the questionnaire seriously.

3.3. Study 3: the disambiguated experiment

3.3.1. Materials

The results of Study 1 indicate the descriptive ambiguity does exist in Kripke's Gödel case. Thus, our next step is to uncover people's real referential intuitions, along with the impact of the descriptive ambiguity on previous literature. The most straightforward way is to ask the participants to explain their answers directly, as Sytsma and Livengood used to uncover intentional ambiguity in Kripke's Gödel case (Sytsma & Livengood 2011). Based on previous studies, we modeled the reason-based probe choice to distinguish descriptivists who accept the description of the social fact from Kripkeans, while the scenario remained the same as in Study 2. An online simplified Chinese questionnaire with randomized answer choices was given to participants. The English translation of the probe question is given below (see Appendix A.3 for the original Chinese version):

> When John uses the name "Gödel", he is talking about:
>
> (A) the person called "Gödel", because he is widely believed to have discovered the theorem.
> (B) the person called "Schmidt", because he really discovered the theorem.
> (C) the person called "Gödel", because his real name is "Gödel".
> (D) the person called "Schmidt", because this name refers to him intuitively.

Choice (A) indicates descriptivists who accept the description of the social fact, Choice (B) indicates descriptivists who accept the description of the brute fact, and Choice (C) indicates Kripkeans. To balance the choices, we used a vague Choice (D) to make sure "Gödel" and "Schmidt" appeared the same times in the probe.

In light of Hempel's deductive-nomological model in scientific explanation, we used reason-based probe choices to investigate people's real inclination toward theories of reference. In this model, theories of reference served as general laws, the reasons served as particular facts, and the intuitions of proper names served as explanandum. The reasoning structures are as follows,

> Theory: The descriptivist theory of reference
> Reason: Gödel/Schmidt is the widely-believed/real discoverer of the theorem
>
> ---
>
> Intuition: "Gödel" refers to Gödel/Schmidt

and

> Theory: The causal-historical theory of reference
> Reason: Gödel's real name is "Gödel" (which is the causal-historical chain)
>
> ---
>
> Intuition: "Gödel" refers to Gödel

In the probe question, the reasoning structures are applied in the form of elliptic explanation, viz. "intuition + reason", to investigate people's real inclination to theories of reference. The phrases of descriptions or the causal-historical chain in choices serve as reasons for the following judgments, e.g. "Gödel" refers to the person called "Schmidt/Gödel". For descriptivists, the reason must be a description, no matter the description of the social fact or the description of

the brute fact, while for Kripkeans, the reason must be the causal-historical chain of the individual's real name dating back to the time when it was introduced. Choice (D) did not satisfy any of the reasons, so it was treated as neither descriptivist intuition nor Kripkean intuition.

3.3.2. Participants

Newly admitted undergraduates from Mainland China participated (N = 136, 115 males, 21 females; age range: 17-19, mean = 18). All the participants were native Mandarin-speaking, ethnically Chinese speakers, and none of them majored in philosophy. Besides the 136 competent participants, two participants were excluded because they took less than ten seconds to answer the questionnaire.[6] Two more participants were excluded because they chose Choice (D), which cannot be counted as descriptivist intuition or Kripkean intuition.

3.3.3. Result

The result is displayed in Figure 3. The proportion of Kripkeans is 15.4 percent and is significantly lower than that in Study 2 (Z = −3.22 < −$Z_{0.001}$ = −3.10, p = .001, one-tailed). This result supports our hypothesis 2 that the actual proportion of Kripkean in the disambiguated experiment is lower than that in the original study, in which descriptivists who associated with the description of the social fact were miscounted as Kripkeans. Besides, this result also indicates that 53.7 percent of the participants accept the description of the social fact, significantly higher than that 30.9 percent of the participants accept the description of the brute fact, which supports our hypothesis 1 once again.
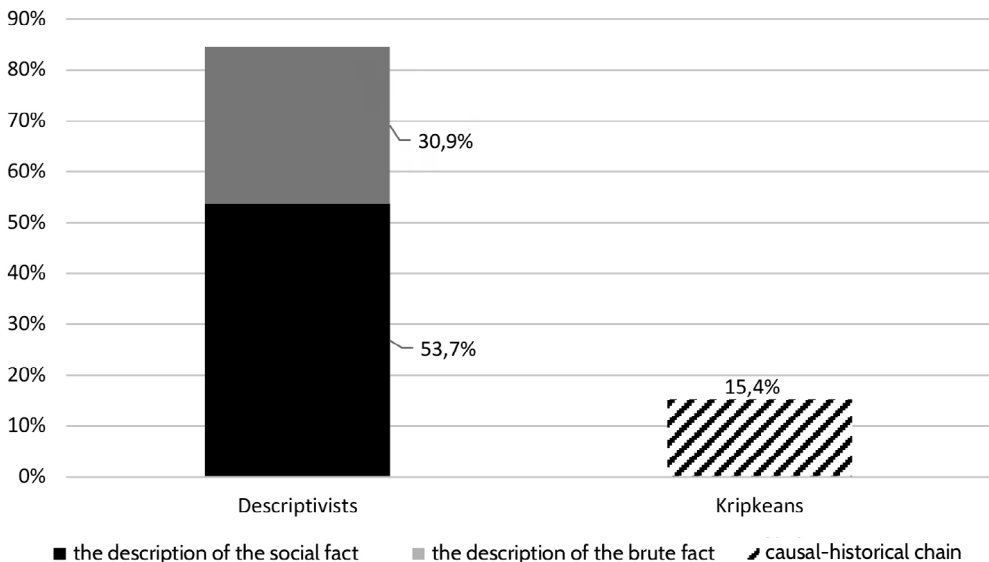
Figure 3

The result of the disambiguated Gödel case

---

6   97% of the participants took 34 seconds or longer to answer the questionnaire.

4. Discussion

The descriptive ambiguity partly comes from some epistemic issues. One possible explanation for the cause of the descriptive ambiguity is people's different inclinations between brute facts and social facts. In general, limited information casts doubt on the reliability of the description of the brute fact so that people are more inclined to admit the description of the social fact as a consensus. In Kripke's Gödel case, people do not know whether there is a potential "Schmidt" or not, but they (at least some of them) know there could be. Thus, they prefer to talk about a social fact instead of a brute fact. As a result, the descriptive ambiguity undermines the construction of Kripke's Gödel case and Machery *et al.*'s experimental interpretation, because descriptivists who associated the alternative descriptions D2 were miscounted as Kripkeans. But on the other hand, we should note that whether cross-cultural divergence of intuitions exists or not is still open to question. Our study clarifies the descriptive ambiguity and challenges Machery *et al.*'s experimental design and interpretation, but the divergence of referential intuitions may still exist. Further large-scale cross-cultural disambiguated experiments on Westerners are still needed to examine the impact of such descriptive ambiguity and to uncover ordinary people's real referential intuitions. Until then can we know whether cross-cultural referential intuitions vary or not.

To clarify the descriptive ambiguity in Kripke's Gödel case, we provide a tentative way to investigate people's real referential intuitions in Study 3, based on previous literature on the relationship between intuition and reason. Unlike the common view that intuition and reason are sharply opposed in the reasoning process, Stocks (1936) argues that intuition and reason are complementary and interdependent with each other. Fricker (1995) moves further on their intimate relation and emphasizes only by taking intuition and reason into consideration can we understand the nature of these two terms as well as human reasoning. Fricker also proposes a generate-and-test model, viz. intuitions work as generators and reasons work as testers, as a way of such cooperation. Koksvik (2013) addresses a new reply to experimental philosophy from his finding that intuitions can result from conscious reasoning. However, he further argues that philosophers' expertise intuitions usually result from conscious reasoning and track the truth reliably, while the intuitions probed in experimental philosophy do not, so the challenge from experimental philosophy misses its target. However, although our research supports Koksvik's main point, it opposes his reply to experimental philosophy because ordinary people's intuitions can also result from conscious reasoning. In conclusion, the above research suggest that we should take intuition and reason into integrated consideration in the practice of experimental philosophy. The reason for a specific choice, if applicable, is a possible way to rule out non-philosophical factors and to elicit people's real intuitions.

Appendix A

A.1.1. Kripke's Gödel case in simplified Chinese

假设你在大学学习时得知有一个叫做哥德尔的人发现了一个重要的数学定理，叫做"不完备性定理"。你很擅长数学，并且能够准确地说出不完备性定理的内容。但这是你对哥德尔仅有的了解。大多数人与你一样，他们唯一知道的事情就是哥德尔发现了不完备性定理。

　　你认为哥德尔是：

(A) 不完备性定理的真正发现者
(B) 不完备性定理的公认发现者

A.1.2. The Bi Sheng case in simplified Chinese

北宋政治家沈括（1031-1095）在其著作《梦溪笔谈》中记载了民间工匠毕昇发明的"活字印刷术"。活字印刷术是指用胶泥做印，每个印刻一个字，排列印刷的技术。但这是你对毕昇仅有的了解。大多数人与你一样，他们唯一知道的事情就是毕昇发明了活字印刷术。

　　你认为毕昇是：

(A) 活字印刷术的真正发明者
(B) 活字印刷术的公认发明者

A.2. Machery's original scenario in simplified Chinese

假设约翰在大学学习时得知有一个叫做哥德尔的人发现了一个重要的数学定理，即"不完备性定理"。约翰擅长数学，且他对该定理能做出准确陈述。他认为该定理的发现者是哥德尔，但是，他对哥德尔的了解仅限于此。

　　但假设哥德尔实际上不是该定理的发现者，它的真正发现者是一个叫做施密特的人，这个叫做施密特的人的尸体几年前在世人未知的情况下在维也纳被发现。而他的朋友哥德尔，因为种种原因得到了他的手稿，并声称自己才是该手稿的作者，而世人也认为哥德尔是该定理的发现者。因此，哥德尔被公认为是这个定理的发现者。

　　大多数人听到哥德尔这个名字的反应和约翰一样，他们唯一所知的关于哥德尔的仅是他发现了"不完备性定理"。

　　当约翰使用哥德尔这个名字时，他指的是：

(A) 得到手稿并声称自己是该手稿作者的人；
(B) 真正发现"不完备性"定理的人。

A.3. The disambiguated Gödel case in simplified Chinese

(The scenario remained the same as A.2, while the probe question was replaced as the following one.)

　　当约翰使用哥德尔这个名字时，他指的是：

(A) 名为"哥德尔"的人，因为他是定理的公认发现者；

(B) 名为"施密特"的人，因为他是定理的真正发现者；
(C) 名为"哥德尔"的人，因为他原本的名字就是"哥德尔"；
(D) 名为"施密特"的人，因为从直觉上来说应该指他。

REFERENCES

Cappelen, H. (2012). *Philosophy without intuitions*. Oxford: Oxford University Press.

Deutsch, M. (2009). Experimental philosophy and the theory of reference. *Mind and Language*, 24(4): 445-466.

Deutsch, M. (2010). Intuitions, counter-examples, and experimental philosophy. *Review of Philosophy and Psychology*, 1(3): 447-460.

Devitt, M. (2011). Experimental semantics. *Philosophy and Phenomenological Research*, 82(2): 418-435.

Devitt, M. & Porot, N. (2018). The reference of proper names: Testing usage and intuitions. *Cognitive Science*, 42(5): 1552-1585.

Domaneschi, F., Vignolo, M., and Di Paola, S. (2017). Testing the causal theory of reference. *Cognition*, 161: 1-9.

Domaneschi, F. & Vignolo, M. (2020). Reference and the ambiguity of truth-value judgments. *Mind and Language*, 35(4): 440-455.

Fricker, M. (1995). Intuition and reason. *The Philosophical Quarterly*, 45: 181-189.

Heck, R. K. (2018). Speaker's reference, semantic reference, and intuition. *Review of Philosophy and Psychology*, 9: 251-269. (Originally published under the name "Richard G. Heck, Jr".)

Ichikawa, J., Maitra, I., and Weatherson, B. (2012). In defense of a Kripkean dogma. *Philosophy and Phenomenological Research*, 85(1): 56-68.

Izumi, Y., Kasaki, M., Zhou, Y., and Oda, S. (2018). Definite descriptions and the alleged east-west variation in judgments about reference. *Philosophical Studies*, 175: 1183-1205.

Koksvik, O. (2013). Intuition and conscious reasoning. *Philosophical Quarterly*, 63: 709-715.

Kripke, S. (1972/1980). *Naming and necessity*. Cambridge, MA: Harvard University Press.

Lam, B. (2010). Are Cantonese speakers really descriptivists? Revisiting cross-cultural semantics. *Cognition*, 115, 320-329.

Ludwig, K. (2007). The epistemology of thought experiments: First-person approach vs. third-person approach. *Midwest Studies in Philosophy*, 31(1): 128-159.

Machery, E., Mallon, R., Nichols, S., and Stich, S. P. (2004). Semantics, cross-cultural style. *Cognition*, 92, B1-B12.

Machery, E., Olivola, C. Y., and de Blanc, M. (2009). Linguistic and metalinguistic intuitions in the philosophy of language. *Analysis*, 69(4), 689-694.

Machery, E., Deutsch, M., Mallon, R., Nichols, S., Sytsma, J., and Stich, S. P. (2010). Semantic intuitions: Reply to Lam. *Cognition*, 117: 361-366.

Machery, E. (2012). Expertise and intuitions about reference. *Theoria: An International Journal for Theory, History and Foundations of Science*, 27(1): 37-54.https://doi.org/10.1387/theoria.3482

Machery, E., Sytsma, J., and Deutsch, M. (2015). Speaker's reference and cross-cultural semantics. In A. Bianchi (Ed.). *On reference* (pp. 62-76). Oxford: Oxford University Press.

Martí, G. (2009). Against semantic multi-culturalism. *Analysis*, 69(1): 42-48.

Martí, G. (2012). Empirical data and the theory of reference. In W. P. Kabasenche, M. O'Rourke and M. H. Slater (Eds.), *Reference and Referring. Topics in Contemporary Philosophy* (pp. 63–82). Cambridge, MA: MIT Press.

Nichols, S. & Ulatowski, J. (2007). Intuitions and individual differences: the Knobe effect revisited. *Mind and Language*, 22(4): 346-365.

Searle, J. R. (1958). Proper names. *Mind*, 67(266), 166-173.

Sosa, E. (2007). Experimental philosophy and philosophical intuitions. *Philosophical Studies*, 132: 99-107.

Stocks, J. L. (1936). Reason and intuition. *Philosophy*, 11(43): 288-300.

Sytsma, J. & Livengood, J. (2011). A New perspective concerning experiments on semantic intuitions. *Australasian Journal of Philosophy*, 89(2): 315-332.

Sytsma, J., Livengood, J., Sato, R., and Oguchi, M. (2015). Reference in the land of the rising sun: a cross-cultural study on the reference of proper names. *Review of Philosophy and Psychology*, 6: 213-230.

Vignolo, M. & Domaneschi, F. (2018). Referential intuitions are still problematic. *Analysis*, 78(3): 472-483.

Chao Ding received his PhD in philosophy at Tsinghua University in 2022. His work mainly focuses on experimental philosophy, philosophy of science, and philosophy of language.

Address: Department of the History of Science, Tsinghua University. Shuangqing Road 30, 100084, Beijing, China. Email: dc121788560@gmail.com – ORCID: 0000-0001-7852-7492

Chuang Liu is a professor of philosophy at Fudan University, China, whose main areas of research are philosophy of science and philosophy of physics, with a main focus on idealization and approximation, theories and models, and philosophy of quantum physics.

Address: School of Philosophy, Fudan University. Handan Road 220, 200433, Shanghai, China.